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JAN 19 1899

THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. NOVEMBER 3, 1898. CHICAGO, ILL. NUMBER 44

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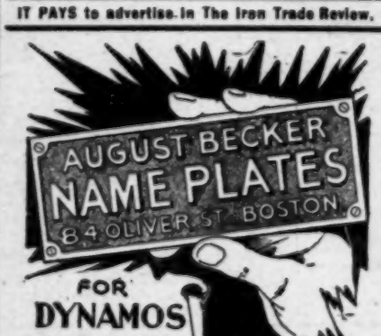

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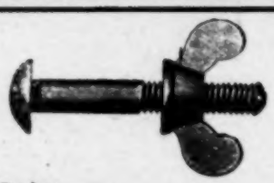

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. NOVEMBER 3, 1898. CHICAGO, ILL. NUMBER 44

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

Reports from iron and steel centers agree that October has ended in quietness more pronounced than in any of the weeks preceding. The heavy furnace and mill shipments obscure the real condition as to new business; but at the same time it is not to be overlooked that the volume of new orders would have been considered large for any other end-of-the-year period. The new standard for outputs has established remarkable requirements for an active market. Recent export business has furnished quite as conspicuous tonnages as the current domestic trade. In the past week one Southern interest made two sales of 2,000 and 5,000 tons respectively for European consumption, the latter being basic iron. In the East, October export orders saved the market for finished material from weakness; and to the Coolgardie contract, from which this country is certain to get a large tonnage of plates, is to be added steady bookings of rails, billets, sheet bars and rods. The news of the week promises further additions to outer trade, in the first authoritative announcement of plans for a rod and wire plant in the Birmingham district. Most of the 600 tons daily product of open-hearth rods, wire and nails will go abroad. The possibilities in low cost are record-breaking. Railroad calculations for 1899 are known in a general way to be large, both as to rails and rolling stock, but the rail price is still a matter of uncertainty. The Nov. 1 appointment for a New York meeting has been changed to Nov. 15. There is not entire unanimity either as to the proposition for an agreed price or as to the figure. The outcome may be an agreement on practically the price of the early part of the year—$18, Pittsburg, with a differential of but $1 for Chicago, instead of the nominal gap of $2, as heretofore. The pig iron market has drifted along of late, with less attention apparently given to the statistical features of the situation than might be expected. Sellers are not a unit, and the disparities between quotations from different sources show that the habit of fearfulness and distrust in many producers has outlived conditions that begot it. Cincinnati reports that recent sales through agencies there have been chiefly of Northern iron, which continues to be lower priced than Southern iron. When the steel plant at Birmingham starts up in the summer of 1899 and the output of four Alabama furnaces is lifted off the market, a still stronger market for Southern grades may be expected. Bessemer pig iron is not in demand and though a sale at $9.60 at furnace is reported, the market will not be definitely located until the large consumers buy again. Steel billets are inactive and are more plentifully offered at $15.50 Pittsburg maker's mill for 1899 delivery. Eastern plate and structural mills have been made easier by the recent distribution of considerable shipyard work and look forward to the winter as likely to be the busiest in several years. Confidence in the carrying out of the plans for the tin plate combination seems at last to be extending to consumers. There has been an advance of 5 cents a box in the past week, with signs of nervousness over the situation, inquiries being much larger, with fair buying for 1899. Most of the mills, however, are withdrawing as sellers for delivery beyond March.

PITTSBURG.

OFFICE OF *The Iron Trade Review and Industrial World.* 705 PUBLICATION BUILDING, Nov. 2.

The general market is easy. This condition having persisted for some time is construed by some to mean a drop in prices before a rise. Others, more optimistic, predict a rise as the next change. Export orders and inquiries are a large factor in current mail, a gratifying feature from all standpoints.

PIG IRON.—The movement is decidedly slow. Valley quotations on Bessemer are from $9.75 to $9.85 with $10.25 as about the price delivered Pittsburg. Practically no business is being done. Gray forge and foundry irons are likewise very quiet, the former being quoted from $9.20 to $9.35 Pittsburg, and the latter on the basis of $10.10 to $10.25 for No. 2. We quote as follows:

Bessemer, valley furnace	$ 9.75 to 10.00
Bessemer, Pittsburg	10.25
No. 1 Foundry	10.50 to 10.60
No. 2 Foundry	10.10 to 10.25
No. 3 Foundry	9.65 to 9.85
Gray Forge, valley furnace	8.80 to 8.95
Gray Forge, Pittsburg	9.20 to 9.35

BILLETS.—In some quarters billets are reported lower than at last week's report and this is true in the case of desirable contracts, but the usual price is $15.50 on orders for next year's delivery. Sheet bars are quoted $16.75, maker's mill, and rods from $21.50 to $22. The consumers of tin plate seem to have changed their opinion on the impracticability of the formation of a trust, as the last few days have witnessed a decided buying spirit which has stiffened prices somewhat and further advances are prophesied.

SPELTER.—This metal continues its upward march. The present price is $5.05 Pittsburg, with every reason to look for further advances.

SHEETS.—The situation is still unsatisfactory from the producer's standpoint. A fair tonnage is being placed, but prices are not well maintained, either for black or galvanized. The condition of order books seems to determine entirely the flexibility of quotations. On No. 28 the market is 1.90c to 1.95c. Galvanized sheets are quoted from 80 and 5 to 80 and 10 per cent off list, with an additional 2½ on larger orders. Sellers holding for the former price report a good business on that basis.

PIPES AND TUBES.—The rumored advance noted last week is looked upon as questionable by some of the trade, though others think it both probable and warranted by conditions. Current business continues excellent, with no disturbing features. The additional discounts of six tens for less than carload lots and six tens and five per cent off list for carload lots are being quoted. Large orders are granted concessions. Base discounts are: Butt weld, black, 55 per cent off; lap weld, black, 65 per cent off; butt weld, galvanized, 47½ per cent off; lap weld, galvanized 52½ per cent off. Discounts on merchant boiler tubes are as follows: 2¼-inch and smaller, 72½ per cent off; 2½ inch and larger, 75 per cent off. Inserted joint casing is now quoted at 60 off and screw and socket joint casing at 60 and 10 per cent off.

IRON AND STEEL SKELP.—While the mills are still very busy the demand has fallen off somewhat, and prices are easier than for some time past. Quotations are as follows: Grooved iron skelp, 1.10c to 1.12½; sheared iron skelp, 1.20c to 1.25c; grooved steel skelp, 1c to 1.05c; sheared steel skelp, 1.10 to 1.12c½.

SPIEGEL AND FERRO MANGANESE.—The quotation of $50 for 80 per cent domestic ferro-manganese is still the market. The demand for spiegel is very quiet; $23.50 to $24 is the range of price.

STRUCTURAL MATERIAL.—The week has been uneventful The volume of business is excellent and exceedingly heavy shipments were made during the whole of last month. Prices are as follows: Beams and channels, 3 to 15 inches, 1.20c; 18 to 24 inches, 1.30c; tees, 1.25c; zees, 1.20c and angles 1.10c. Universal plates are now quoted at 1.10c; other shapes, 1.05c.

PLATES.—The local mills are very busy and current tonnage is excellent. Railroads are steady buyers and both orders and tonnage have increased. Tank plate is quoted variously from 1 05c to 1.15c, the latter price being quoted by mills already filled for months to come. Other mills shade 1.10c on a desirable order. We quote shell steel, 1.20c; flange, 1.25c; fire-box, 2c and upwards.

RAILS AND TRACK MATERIALS.—The mills are pushed to their limit on rails, both standard and light sections. Prices are nominally the same as for some time past—light sections, from $19 to $19.50 and standard sections at $18. Pending the New York meeting of manufacturers nothing is doing. The quotation on other materials is as follows: Spikes, 1.45c; track bolts, 1.65c to 1.70c; splice bars 1.10c to 1.15c; links and pins are quoted from 1.20c to 1.27½c.

OLD MATERIAL.—The movement is moderate. The tendency is towards lower prices in some materials. A sale of 1,500 tons of iron rails at $13.75 valley is noted. Other materials are quoted as follows: Wrought iron scrap, $11.50 net, valley; cast borings, $6; busheling scrap, $9, net; car wheels, $10 25, gross; cast scrap, $8.75, gross; iron axles, $6, net; steel axles, $12.50, gross; charcoal scrap, $10, gross; billet and bloom ends, $11; machinery scrap, $9; wrought turnings, $6.75 net, valley.

CLEVELAND.

OFFICE OF *The Iron Trade Review and Industrial World.*
27 VINCENT ST., NOV. 2.

The iron ore shipping season is hastening to a close, and the November shipments from ports at the head of Lake Superior promise to be less than in the last month of the average season, considerably below those of last November, from present indications. The car supply at lower lake ports has been almost entirely dependent on the coal trade, ore going on the dock except as cars emptied of coal are available. A tendency that has appeared in the ore trade of the year is the increased demand for the high phosphorus ores. The great reduction in the supply of mill cinder from puddle mills is being emphasized, as is the undesirability of heating furnace cinder and scale, which is largely steel, and requires an increased fuel expenditure when used in the blast furnace. An increasing percentage of higher phosphorus ores is required to make up for the declining supply of high phosphorus mill cinder. Several non-Bessemer properties on the Menominee range notably in the Crystal Falls district, are starting up to supply the demand.

PIG IRON.—The trade in foundry irons is quiet and no general buying movement is expected until later in the year. The average valley furnace holds for $9.50 for No. 2 foundry, but on the occasional order involving a considerable amount this is being cut. On some recent Northwestern Pennsylvania business a low price was made. Bessemer pig iron has sold at $9.60 valley furnace, but the fact that important consumers are not in the market strips the few small transactions of any significance. The arrangement for the sale of valley Bessemer through one agency, as announced three weeks ago, means such competitive prices as will take going business, and outside furnaces will not now be able to make sales by simply going a trifle under a fixed delivered price. Gray forge is quoted $8.75 to $8.85 valley furnace and basic iron at $9. Lake Superior charcoal is strong at the quoted rate. While the freight to Pittsburg from the valley is now openly quoted at 50 cents, the 65 cent rate to Cleveland is reported to be still maintained. We quote f. o. b. Cleveland:

Bessemer	10 40@10 55	Valley Scotch No. 1	$10 40@10 50
No. 1 Strong Foundry	10 40@10 65	Valley Scotch No. 2	10 15@10 40
No. 2 Strong Foundry	10 15@10 25	Gray Forge	9 40
No. 3 Foundry	9 65@ 9 90	Lake Superior Charcoal	11 50

FINISHED MATERIAL.—Little activity is to be reported in any line of mill products for the past week. The agricultural works contracts recently pending have been closed, two aggregating about 1.500 tons of plates, bars and shapes. Winter work for the mills is being sought with a little more eagerness. Shipbuilding is counted on for a fair winter's tonnage, but beyond three or four boats heretofore announced, this is as yet an intangible factor. We quote plates at 1.17½c, Cleveland; beams and channels, 1.28½c; No. 28 black sheets, 2c to 2.05c; bar iron, 1c; steel bars, 1c—with no business developing in the week large enough to test the situation. Bar and sheet mills are making rather more of a push for business, but with prices practically unchanged. The wire and wire nail markets are only moderately active. The reduction in wire nails was with a view to stimulating buying by the jobbers who have been allowing the manufacturer to carry stocks. We quote $1.37½, Cleveland, for single carload lots. Smooth wire is $1.20 in single carload lots. The advance in spelter has advanced "four-point" galvanized wire to $1.75.

CHICAGO.

OFFICE OF *The Iron Trade Review and Industrial World.*
1522 MONADNOCK BLOCK, NOV. 2.

Little change in the situation is seen in the week. Some branches of the market have been quiet, while others have been quite active. Generally speaking, the activity has not equalled that of several weeks previous, but the tone continues firm, and in no department are concessions being made to secure business. In fact, there has been considerable talk of advances on some grades of iron and steel, and it is thought the future will bring slightly higher values in several forms of finished product.

PIG IRON.—Sales last week were only small, and the inquiries in hand do not denote any large increase in the immediate future. There are two or three inquiries in the market now for from 1.000 to 2.000 tons each, which are expected to develop into orders within a short time, but most of the business being placed and under consideration is of the small order variety. Buyers do not appear to be in any rush to come into the market, notwithstanding the numerous rumors of higher prices to come soon. Their wants appear to be very well satisfied for the balance of this year, at any rate. This is the only weak feature of the market. The furnaces are all very firm in their views, and are not taking business except at the full quotations. President Baxter, of the Tennessee company, was in this city last week, and expressed the belief that prices of Southern irons, especially of the higher numbers, will advance within the next month. He based this prediction upon the fact that the furnaces in the South are full of orders, while stocks are very small. The foreign business of these furnaces has been large, and has prevented any surplus. Many of the foreign sales, too, have been made at prices higher than are secured for the same grades of iron in this country. Quotations are unchanged, as follows:

Lake Sup. Charcoal	$11 50@$13 00	Southern Coke No. 3	$10 35@10 60
Local Coke Fdy. No. 1	11 50@12 00	Southern No. 1 Soft	10 85@11 10
Local Coke Fdy. No. 2	11 00@11 50	Southern No. 2 Soft	10 60@10 85
Local Coke Fdy. No. 3	10 75@11 00	Southern Silveries	11 25@11 50
Local Scotch Fdy. No. 1	11 50@12 00	Jackson Co. Silveries	12 50@14 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Strong Softeners	12 00@12 50
Local Scotch Fdy. No. 3	10 75@11 00	Alabama Car Wheel	15 00@16 00
Southern Coke No. 1	10 85@11 10	Malleable Bessemer	11 50@12 00
Southern Coke No. 2	10 60@10 85	Coke Bessemer	11 50@12 00

BARS.—Several quite large orders were closed last week, including one of over 1,000 tons. Considerable business was done in small lots, and altogether the tonnage of the week was fully up to the average. The market is firm, mills holding to quotations in nearly every case and only exceptional sales under the figures we give. Quotations are made at 1.05c to 1.10c for common iron, 1.10c to 1.20c for guaranteed iron, and 1.15c to 1.20c for soft steel bars from strictly billet stock.

RAILS AND TRACK SUPPLIES.—The meeting of rail makers scheduled to take place Nov. 1 was postponed again, and will now be held, it is expected, about Nov. 15. Meanwhile, no quotations are being made on standard sections. Considerable business was done last week by the local mills in light rails, which are in good demand. Quotations are as follows: Steel splice bars, 1.15c to 1.25c; track bolts with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.55c to 1.60c.

BILLETS AND RODS.—No business of any consequence was

done in this market last week in either billets or rods. A few small sales of rods were the only transactions. Billets are still quoted at $17 and rods at $22.50.

CAR ORDERS.—Business was light, both in car orders and orders for car material. The car works in this territory are all full of work for some time ahead, and are making requisitions on their old contracts for material fully as fast as the mills can fill them.

STRUCTURAL MATERIAL.—No large contracts of any character were let last week. General business in small lots made up a good tonnage, and seems likely to continue good for some time. The market continues firm. Quotations are unchanged, as follows: Beams, 15 inch and under, 1.35c to 1.40c; 18-inch and over, 1.45c to 1.50c; angles, 1.25c to 1.30c; plates, 1.20c to 1.30c; tees, 1.40c to 1.45c; zees, 1.35c to 1.40c. Small lots from stock are quoted at ¼c to ½c higher.

PLATES.—A good small lot trade was done last week. The only large order up at present is for about 1,500 tons of ship plates, which will be placed this week, it is thought. Quotations are made as follows: Tank plates, 1.20c to 1.30c; flange steel, 1.30c to 1.40c; firebox steel, 1.85c to 5c.

SHEETS.—Sales of both black and galvanized sheets last week were very fair, and included several quite large orders. The demand keeps up well and dealers are looking for a good business for the next month or so. The market is firm at 2 10c to 2 10c for black and 80 and 5 per cent discount for galvanized.

MERCHANT STEEL.—There is a heavy demand for nearly all kinds of high grade steels, and sales last week included several very large orders. Mills are not pushing for business at present, having well filled order books, but notwithstanding this the tonnage placed every week is heavy. Consumers are a good deal more anxious to do business than are the mills. Quotations follow: Open-hearth spring, tire and machinery steel, 1.65c to 1.75c; smooth finished machinery steel, 1.60c to 1.70c; smooth finished tire, 1.50c to 1.60c; tool-steel, 5.50c to 7.50c; specials, 11c and upwards.

SCRAP.—The market continues quiet, with small sales of most kinds of scrap. There is some demand for cast scrap, and a few sales were made, but none were of large size. Old iron rails are in fairly good demand, with one sale closed of 1,000 tons. Dealers' selling prices are as follows:

Old iron rails, gross,	$12 50@$12 75	Axles, net	$14 25@$14 75
Old steel rails, long, gr.	10 50@ 11 00	Cast borings, net	4 25@ 4 50
Old steel rails, short	8 75@ 9 00	Wrought turnings, net	6 00@ 6 50
Old wheels, gross	11 00@ 11 50	Axle turnings, net	7 00@ 7 25
Railroad forge, net	11 50@ 12 00	Mixed steel gross	7 45@ 7 50
Dealer's forge, net	10 00@ 10 50	Stove plates, net	5 75@ 6 00
No. 1 mill, net	7 50@ 8 00	Heavy melting stee,gr.	8 25@ 8 50
Heavy cast, net	8 50@ 9 00	Old iron splice b., net.	12 75@13 00
Malleable cast, net	8 00@ 8 50		

CINCINNATI.

Nov. 1.

Business in pig iron is steady and quiet. There is a regular run of small orders, the majority of which are not for Southern iron. This of course is easily explained by the fact that Southern iron is actually higher in price at most points of consumption than Northern iron. This state of affairs apparently is not troubling the Alabama iron masters in the least. Their order books for domestic shipments are still filled, in fact so well filled that they are not yet shipped up to their specifications. The strength of their position appears to lie however, in the continued and increasing demand for export. Last week the leading Birmingham interest sold 2,000 tons for delivery in Manchester, Eng. It likewise sold 5,000 tons of basic iron for delivery in Italy. It is reported that one of the Birmingham furnaces at the present time is sending three-fourths of its iron abroad and, in fact, it appears that the export trade as far as Birmingham is concerned is only limited by vessel room. One notable new feature of the export business is the fact that the foreigners are now taking a general line of iron instead of simply taking No. 3 foundry, with which grade the trade originated. No. 4 foundry, gray forge, No. 2 foundry and Nos. 1 and 2 soft are being called for in good quantities. The scarcity of Southern soft grades is quite pronounced, and Alabama No. 3 foundry is short in supply. Charcoal irons, in the high numbers, are in demand beyond production. The railroads have added quite liberally to their rolling stock through the year, not only in the number of cars, but in increased tonnage capacity; but the equipment is inadequate for the expanded business of the country. Upon the full movement of the cotton crop, the difficulties attending the shipments of pig iron and coke will be increased. We quote for cash, f. o. b. Cincinnati: Southern coke No 1 foundry, $10 to $10.25; No. 2, $9.75 to $10; No. 3, $9.25 to $9.50; No. 4 and gray forge, $8.75 to $9; mottled, $8.75 to $9; No. 1 soft, $10 to $10.25; No. 2, soft, $9 75 to $10; Hanging Rock charcoal, No. 1, $14.50 to $15.50; Jackson Co., silvery, No. 1, $12 to $12.50; standard Georgia car wheel, $14.25 to $15.

BUFFALO.

Nov. 1.

Rogers, Brown & Co. report the market as follows: "Although the season is now at hand when foundries generally aim to arrange contracts so that the inventory time finds the iron yard as bare as practicable, yet in the past week contracts have been made by some of the larger consumers in this vicinity for iron to run them far into the future. There is now more of a disposition to cover ahead. One foundry purchased 5,000 tons, and expressed a willingness to purchase more if delivery was extended beyond the point the furnace was willing to concede. Local furnaces are behind on orders for every grade. This, together with the extreme and continued scarcity of available cars, is causing considerable inconvenience to many foundries. Prices remain very firm, with indications of a quite probable advance in the near future." We quote for cash f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, $11.25; No. 2, $10.75; Ohio strong softener, No. 1, $11 25; No. 2, $10.75; Jackson County silvery, No 1, $14; Southern soft, No. 1, $11.75; No. 2, $11 50; Lake Superior charcoal, $12 to $12.50; coke malleable, $10.75.

THE new plate mill building of the Carnegie Steel Co., Ltd., for which ground has been broken at Homestead, Pa., will be 200x250 feet. Excepting the armor plate plant, it will be the most important of the company's mills at Homestead. In it will be rolled all descriptions of plates, including the lighter armor plates. The new mill is located just east of the present plant, near the open-hearth department, where an abundant supply of hot metal will be at all times available. The ground is now only a few feet above the river level. It is the intention of the company to construct very substantial foundations, after which the entire tract will be filled in to a depth of about 50 feet, placing the machinery at the level of the present plant and well out of the reach of floods.

NONE of the representatives of large interests in ore, like the Bessemer Steamship Co. and Pickands, Mather & Co., of Cleveland, have as yet begun preparations for the construction of new vessels, and it is the general opinion that they will do little in the way of new vessels during the coming winter, notwithstanding the improved condition of freights and the prospects for an active season in 1899. Prices asked by the ship-builders are, of course, considerably higher than they were a few months ago, on account of the advance in material, and all building will be delayed by slow delivery of material. These conditions are not of a kind to prompt the big ship-owning companies to place orders for new ships, but there will nevertheless be work enough in all the yards.—[Marine Review.

R. D. NUTTALL Co., Allegheny, Pa., is installing a new gear planing machine which will cut gears up to 15 feet diameter and 24 inch face. It is the largest machine of the kind ever built. The company's shop are full of work and are operated regularly up to 10 P. M., so great has been the pressure of contract work recently. While the company confined its operations a few years ago to street railroad work, it has come to occupy the broader field offered by the manufacture of gear ing for iron and steel and engineering plants, mining companies, etc.

TENNESSEE Coal, Iron & Railroad Co. stockholders who pay par for $1,100,000 steel works bonds, get $440,000 preferred stock as a bonus, all that is issued, while the company keeps the entire common stock of the Alabama Steel & Ship Building Co. in its treasury.

THE IRON TRADE REVIEW
AND
INDUSTRIAL WORLD.

DEVOTED TO MACHINERY, METAL-WORKING AND FOUNDRY TRADES AND IRON AND STEEL MANUFACTURE.

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NOVEMBER 3 1898.

THE NEW STEEL COMPANY.

The plans of the Federal Steel Co. continue to receive considerable newspaper attention. The fact that the three interests now merged in one represent but little over 20 per cent of the authorized capitalization of the new company has prompted several guesses as to further acquisitions. The rumor printed by a metropolitan journal that the leading Pittsburg interest is to become a part of the big company is probably farther from the truth than anything yet printed. That a splendid organization, unparalleled for strength and effectiveness, in which exists an *esprit* probably unequaled in any company of like magnitude, should want to exchange that ideal condition for any scheme of organization fashioned after modern trust architecture, is not to be thought of for a moment. The executives of the new company are wise in finance, and are apt in planning and executing a great stroke in corporate amalgamation; but their success in managing what they have created will depend very largely upon the extent to which technical talent, that has gone unrepresented in the executive committee, is recognized in the actual conduct of the business. Technical men have been the strength of every American steel company that has succeeded. Only a few weeks ago we reprinted from a London contemporary the lament of the directors of a great British steel company that they had failed to put the management of their important interests in the hands of technical experts, who had also a genius for management. The combination is not a common one, but there are some conspicuous examples of it in the United States.

Interest has naturally been aroused by the report of negotiations for including in the Federal Steel Co. the American Steel & Wire Co.'s extensive wire mill properties. It has been officially given out that this matter was kept entirely in abeyance in the formation of the new corporation, but it is admitted that the proposition has had some attention and naturally, because of the large common holdings and the further fact that the wire company is an important customer of the steel company. If such an amalgamation finally comes about, it will not be surprising if at least a portion of the wire company's plants go to Lorain. The saving in freights by such a move and the economy of hot billets, together equal to $1 a ton, are not likely to be overlooked in the ultimate disposal of these properties. There is as good reason, moreover, to look for such an extension of the blast furnace capacity at Lorain as will supply all the wants of the steel plant there. The advantage of the Lake Erie site is only made available when ores and coke are brought together there, and it is not to be supposed that a company of such resources, with ample ore supplies and with its own by-product coking plant will long be a buyer of pig iron from furnaces whose cost is bound to exceed its own, and pay freight into the bargain. While needed extensions at the Chicago plant will come, and the blast furnaces there made as modern in respect to capacity and equipment as they are now in respect to practice, it may be expected that some of the most interesting developments in the way of extensions will be connected with the enterprise at Lorain.

RECENT contracts for the delivery of charcoal from a Pennsylvania plant to charcoal furnaces in Michigan are quite like the carrying of coals to New Castle. The surprising fact about the transactions is that while the freight was about 80 per cent of the delivered cost of the charcoal, the Pennsylvania plant was quite satisfied to get the business, since the charcoal was practically its waste product, wood alcohol and acetate of lime being the materials, along with other chemicals, on which it depends for profit. If charcoal as a residual product can be sold at 1c a bushel at the kilns, it would appear that a charcoal furnace whose fuel costs 5c to 5½c a bushel delivered will have difficulty competing with one fully equipped for the saving of all the distillation of the charcoal burner's smoke. Incidentally, it may be remarked that the modern charcoal iron furnace, with complete equipment for making charcoal and all by-products, is very apt to stay in the race with the coke furnace.

THE labor situation in the Lake Superior region is in striking contrast with what existed four years ago, when the weight of the depression was heaviest upon the country. As against 90 cents a day paid at that time for certain classes of labor at Minnesota mines, $1.35 to $1.50 is now paid, with miners' wages on a proportionately higher scale. The relief organizations, particularly on the Gogebic range, that in 1894 were put to it to keep hundreds of families from starving, have been succeeded in only four years by a very different kind of famine—such a scarcity of labor as the Lake Superior ranges have never known. And yet the story of the very slow recovery of the iron industry from the depths of panic prices is told by the steady exodus of iron mining labor that has gone on in the past few years. Other fields in which recuperation was more rapid have attracted Lake Superior labor,

whose wages have been kept down, even in the period of recovery, by the very low basis on which the iron ore industry has been compelled to operate. It has come to this point at length, that if an adequate supply of ore is to be obtained for the coming year, estimating consumption at the rate of to-day, the iron ore industry must bid enough for labor to draw it from other employments in which it has found larger returns. That means some increase in the market price of ore.

Personal.

W. R. Stirling, of Chicago, formerly of the Illinois Steel Co., has gone on a trip to Europe.

W. B. Brazier, for many years connected with the rail mill, afterwards the shape mill, of the Pottsville Iron & Steel Co., Pottsville, Pa., has taken charge of the rail mill of the Maryland Steel Co., at Sparrow's Point, Md. He succeeds Thomas J. Brown, who resigned to take charge of the new mill at Pueblo, Col.

J. C. Osgood, president, and J. A. Kebler, general manager of the Colorado Fuel & Iron Co., together with President Gates, of the Illinois Steel Co. and party, visited the steel plant at Pueblo last week.

John W. Lambert, vice-president of the American Steel & Wire Co., made an address at Joliet, Ill., last week, before the convention of the Illinois Bankers' Association, on "The Steel and Wire Industries." Mr. Lambert gave a short history of the wire business in America, and outlined some of the advantages of a protective tariff to the steel and wire trades.

Judge E. H. Gary, president of the Federal Steel Co., left Chicago last Saturday to go to New York. He will at once assume direction of the affairs of the Federal company, making his headquarters at New York. Judge Gary has made arrangements to transfer his corporation law business to the firm of Pam, Donnelly & Glennon, of Chicago. He has been legal adviser of many of the largest Chicago corporations, and of the Western branches of several Eastern concerns.

S. A. Benner, of the Carnegie Steel Co., will leave in a few days for the City of Mexico, to establish an agency for the company.

Chas. H. Morgan, of the Morgan Construction Co., Worcester, Mass., has returned to Europe after a short stay in this country.

Heavy Wire Nail Shipments to Japan.

Throughout the month of October very heavy shipments of wire nails for Japan have been made from the Cleveland mills of the American Steel & Wire Co. Every week has seen a large number of cars loaded with nails start from Cleveland for San Francisco. This special activity is in view of the new Japanese tariff which goes into effect Jan. 1, and which provides for a higher duty on iron and steel products. For the trade in Japan and China wire nails are put up in piculs, which represent in weight 133⅓ pounds avoirdupois, this being the standard package in Asiatic commerce, instead of the 100-lb. keg of the United States. This trade of the Central Western wire nail mills with Japan has been going on steadily for the past two years, the connections being made originally by Mr. G. H. Schuler, then of the Consolidated Steel & Wire Co., in a trip to Japan.

THE program for the meeting of the Foundrymen's Association at Philadelphia, Wednesday evening, Nov. 2, included a paper by John A. Penton, editor of *Foundry*, describing the extensive Sulzer foundry at Winterthur, Switzerland. The paper was accompanied by 25 lantern slides, showing construction and plan, as well as the crane system, cupolas, blowers, ladles, holding machines, sand blast, etc. Over 500 men are employed in these works. The question "Who is responsible for the cost of patterns, in the case of fire at a foundry?" was propounded for discussion, being suggested by a suit recently entered against a Philadelphia foundry for $25,000 for the loss of patterns of a customer that were burned with the building, there being no insurance.

LORAIN STEEL CO.'S NEW CONSTRUCTION.

The same expedition that marked the construction of the steel plant at Lorain, O., has been shown in the erection of the two 500-ton blast furnaces now under way. The management has proceeded on the idea that it is good business policy in work involving so large an outlay to get the investment into earning shape as quickly as possible after any considerable part of the cost has gone into it. It is now the expectation that the furnaces will be in blast by April 1, 1899, or about 11 months after ground was broken. One stack has been built, barring the top construction, and the other lacks but little of its full height. The stoves are completed so far as erection is concerned, and the 225-ft. stack, with which the eight stoves will connect, is about finished. Power house and boiler house erection has gone on rapidly and most of the boilers are in place. Practically all the excavation necessary for the bin system, which, as recently described in these columns, is unique in several particulars, is finished, ready for the steel and cast iron work. Dock construction is making headway, and recently the original plans have been extended so as to provide 400 feet additional dock space, this to be utilized for the shipment of rails from the steel plant. Since no ore can be received this season, it is expected that a considerable fleet of ore-laden boats will tie up in Black River with their last cargoes, and thus 75,000 tons of ore will be available before any of the 1899 ore comes down, and the furnaces can be started as soon as ready.

Work on the new blooming mill at the steel plant has been well started, and it is the purpose to have the mill in operation by March 1. This second blooming mill, which is close to the shape mill, will be the natural route of all ingots which are to be rolled into rails, while the present blooming mill will be devoted to billets. When the new mill is finished rails can be rolled direct without reheating. Both mills can be run on billets, if desired. Additional boiler capacity is being provided, the original lay-out of the plant allowing for this extension. The new installation will consist of 4,000 h. p. of Cahall B. & W. boilers in five batteries.

The blooming mill will be substantially a duplicate of the original one. Corresponding to the Galloways engine which was imported for the latter, the new engine, under construction by Mackintosh, Hemphill & Co., of Pittsburg, will be of 10,000 h. p., with 55-inch diameter of cylinder and 60-inch stroke. The pit furnace building will contain four furnaces, of four holes each, built after the company's design. They will be commanded by two vertical charging cranes of 15 tons, from the Morgan Engineering Co. The same installation is provided in the present mill but there one of the cranes is in reserve, while in the new furnace building each crane commands its own line of pits and both can be utilized at the same time for either charging or drawing. The 38-inch blooming mill is to be built by the Frank-Kneeland Machine Co. after patterns furnished from Lorain. The big shear of the old blooming mill is to be duplicated by the Long & Allstatter Co., of Hamilton, O. It is powerfully built, having a gap 10½x32 inches.

THE Lorain Foundry Co., of Lorain, O., is one of the concerns which Government work, added to the regular run of miscellaneous contracts, has kept very busy in the past few months. Some large shipments have been made recently, chiefly to the Morgan Engineering Co., of Alliance, O., and the Walker Co., of Cleveland, both of which have large ordnance contracts on hand. In one shipment last week were an 18-ton casting for a barbette carriage, two segments of a base ring for a 10-inch disappearing gun carriage and other heavy pieces made from air furnace metal, for which the tensile requirements are 24,000 to 28,000 lbs. The company is now employing more than 175 men, and with its two cupolas and its air furnaces has melted as high as 73 tons in a single day. The melt of cupola metal has run up to 50 tons in a day. Excellent results have been secured, from the start, on Government work, and there has been turned out also this year some sugar works castings of unusual size, in addition to the regular ingot-mold and chill roll work and machinery castings. The pressure of heavy work required additional equipment in which was included a second 25-ton electric traveling crane, furnished by the Morgan Engineering Co., of Alliance, O.

A NEW PROCESS FOR SEMI-STEEL.

Bertrand S. Summers and Robert J. Barr, of Chicago, have been granted a patent on a process of making semi-steel, and have assigned it to the Western Electric Co., of Chicago. The metal produced by their formula has magnetic properties and other characteristics fitting it for use in the manufacture of the field magnets of dynamos, motors and other electrical apparatus, but it is adaptable also to other uses. Mr. Summers will be remembered in connection with his paper read at the recent Buffalo meeting of the American Institute of Mining Engineers, on "Modern Cupola Practice and the Physics of Cast Iron." He has made a special study of the chemistry and physics of cast iron, as his Buffalo paper showed, and as is further indicated in the following description of the new semi-steel.

For the manufacture of the field magnets of dynamo-electric machines it is desirable that the metal possess high permeability—that is, offer small resistance to the passage of the magnetic flux or so called "lines of magnetic force"—and also that it should produce small loss due to hysteresis; and it is the object of the present invention to produce a semi-steel having this property of high permeability and low hysteretic loss to a marked degree, whereby a minimum amount of metal is necessitated in the construction of the field-magnet of a given capacity. The semi-steel of our invention does not possess as high permeability as steel; but it is cheaper and can be cast out of a cupola; hence can readily displace cast iron, as it costs about the same or very little more, its properties being about midway between cast steel and cast iron.

The principal ingredients of commercial iron, besides the metal iron itself, are silicon, sulphur, phosphorus, manganese, and carbon. The carbon exists in two forms—the graphitic form, in which the carbon is in the form of graphite in a separated or free condition and distributed throughout the mass, and, second, in the combined form in which the carbon is chemically combined with other substances. In steel used in the manufacture of semi-steel the carbon content is usually from 0.3 to 0.5 per cent, the carbon being practically all in the combined state. In the semi-steel of the prior art, the carbon content averages about 3 per cent. In cast iron the carbon content ranges from 3 to 3.5 per cent, and the most of the carbon is in the graphitic state, in the proportion of, say, 3 per cent graphitic carbon and 0.5 per cent combined carbon.

The sulphur content is kept as low as possible in steel, cast iron, and special metals, such as the semi-steels. The presence of phosphorus tends to lower the breaking strain of the metal, and hence it is to be avoided where the metal is to be subjected to great strain; but the presence of the phosphorus does not affect the magnetic properties of the metal. We are therefore enabled to use metal having a high phosphorus content, which can be procured on the market at a much less cost than low phosphorus metal. When great strength is desired, it is desirable to diminish the phosphorus content. Manganese is kept as low as possible, as it tends to promote combined carbon, and thus lowers the magnetic permeability, which should be high in metal for magnetic purposes. The presence of the combined carbon in the metal tends to lower the permeability, while the presence of graphitic carbon raises the permeability.

In metal for magnetic purposes it is therefore desirable to have a minimum amount of combined carbon and to have the greatest portion of the carbon necessarily present in the metal in the form of graphitic carbon. Silicon in the metal lowers the loss by hysteresis, creates a fluidity which might be lacking in an iron of the same carbon content and less silicon, and, furthermore, prevents undue shrinkage. Silicon also has the peculiar property of throwing the carbon from the combined to the graphitic state. Silicon lowers the saturation point of iron for carbon, so that as the silicon content is increased the quantity of the carbon which the iron is capable of taking up is decreased.

The metal of the present invention is high in silicon content and low in carbon, and the great proportion of the carbon present is in the graphitic state, while a very small proportion of the carbon is in the combined state. A metal or semi-steel is thus produced having peculiarly valuable magnetic properties for a cupola metal. It has a very high permeability and low loss by hysteresis and at the same time possesses a fluidity which enables its ready handling and molding, and the shrinkage of the metal in cooling is a minimum. Furthermore, the high silicon content renders possible a higher steel content in the metal, thus rendering it more dense and tougher, while permitting good tooling. Semi-steels of the prior art usually charge less steel, 30 per cent being considered a high amount. In accordance with the present invention, 40 to 50 per cent is charged. The total carbon seldom exceeds 2.10 per cent and is usually between 1.5 and 2 per cent, most of the carbon being in the graphitic state, the graphitic carbon averaging about 1.75 per cent, but varying from 1.50 to 1.90 per cent. It is the purpose to have as much of the carbon in the graphitic state as possible, and in the best specimens of the metal the combined carbon is less than 0.15 per cent, although it can run as high as 0.40 per cent with slight detriment. The silicon is usually over 4 per cent, but may be as low as 3 per cent; but the value of the metal suffers slightly with the latter proprotion. The average is about 4.10 per cent.

The semi-steel of the present invention is made in a practical way by mixing 45 per cent steel and 55 per cent ferro-silicon iron of a low sulphur content and having about 7 per cent silicon. About 25 per cent more coke is used in the cupola than with ordinary cast iron and the metal is fluid and flows like cast iron. The high silicon content protects the metal from great shrinkage.

The principle of the process is to displace carbon by silicon, so that the total amount of the carbon will be about 1.90 per cent, and as much of this as possible in the graphitic state. Heretofore in production of semi-steel it has been customary to add steel to soft foundry mixture—that is, ordinary cast iron—the carbon content of which is 3 to 4 per cent. The alloy or metal thus produced is high in combined carbon, and the carbon content is considerably over 2 per cent, while in some semi-steels, as the King and Andrews metal, it is about 3 per cent, and in these metals there is more combined carbon than graphitic carbon. The metal of the present invention is rich in silicon, usually over 4 per cent, while the semi-steels heretofore produced seldom have over 3 per cent, the usual proportion being about 2.50 per cent.

While usually employing the proportions above enumerated—that is, 45 per cent of steel and 55 per cent of ferro silicon iron—we have employed other proportions, though the above proportions give the most satisfactory form of semi-steel. With a ferro-silicon iron containing 12 per cent silicon we have used 70 per cent of steel, and with a ferro-silicon iron of 7 per cent silicon we have used about 50 per cent of steel. This demonstrated that silicon may be made to displace carbon, making the metal flow like cast iron. This displacement is limited, however, where it is necessary to tool the metal. When the carbon content is too low the metal becomes too hard.

As a ferro-silicon iron we have used among others the iron known to the trade as "Flaky Ashland" iron. We have also used Tropic Silvery iron No. 1. The compositions of these irons are as follows:

	Flaky Ashland. Per cent.	Tropic Silvery. Per cent.
Silicon	7.10	7.06
Sulphur	.016	.096
Phosphorus	1.13	1.485
Manganese	.585	.75
Graphitic carbon	2.17	1.90
Combined carbon	.15	.34

The carbon of the steel with which the ferro-silicon iron is mixed is wholly combined carbon.

The composition of several specimens of the semi-steel of our invention are as follows:

	First Specimen.	Second Specimen.	Third Specimen.	Fourth Specimen.
Silicon	4.07	4.04	4.11	3.79
Sulphur	.091	.107	.078	.117
Phosphorus	.95	.783	.925	.861
Manganese	.58	.56	.39	.35
Graphitic carbon	1.83	1.75	1.72	1.73
Combined carbon	.11	.13	.03	.08

It will be noted that the semi-steel is rich in silicon and contains a small amount of carbon, the larger proportion of which is in the graphitic state, while a very small proportion is in the combined state. As all of the carbon in the steel employed is combined, it will be noted that the process results

in throwing the carbon from the combined to the graphitic state. This is greatly due to the high silicon content. The silicon content of our semi-steel is larger than the silicon content of cast iron, which usually ranges from 2.8 to 3.2 per cent, and this larger silicon content is one of the distinguishing features of our semi-steel. In semi-steels of the prior art, the silicon content has been much below the silicon content of cast iron, usually from 1.7 to 2.5 per cent.

Another distinguishing feature of this semi-steel is the low carbon content, ranging from 1.75 to 2 per cent, and, furthermore, the large proportion of the carbon in the graphitic state and the low percentage in the combined state, the graphitic carbon ranging in the specimens above considered from 1.72 to 1.83 per cent, while the combined carbon is as low as 0.03 to 0.15 per cent. In semi-steels of the prior art the carbon content is quite high and a considerable quantity of carbon is in the combined state. Thus in the Ramsey semi-steel the carbon content is as high as 3 per cent, the graphitic carbon averaging, say, 2.5 per cent, while the combined carbon runs from 0.55 to 0.78 per cent. In some forms of semi-steelof the prior art—as, for instance, in the King and Andrews semi-steel—the carbon content is as high as 3 per cent, with the combined carbon and the graphitic carbon about equal in proportion, while in some semi-steels the combined carbon is even in excess of the graphitic carbon.

The following is an analysis of the composition of a specimen of the King and Andrews semi-steel and of several other semi-steels and of cast iron:

	King & Andrews.	Other Semi-steels.		
Silicon	1.74	2.491	2.373	2.243
Sulphur	.099	.088	.095	.1
Phosphorus	.434	.839	.771	.706
Manganese	.684	.717	.499	.79
Graphitic carbon	1.42	2.62	2.53	2.383
Combined carbon	1.56	.556	.666	.785

ANALYSIS OF CAST IRON.

Silicon	3.11	2.81	2.91
Sulphur	.057	.07	.063
Phosphorus	.723	.607	.407
Manganese	.586	.582	.303
Graphitic carbon	3.08	3.15	2.84
Combined carbon	.039	.25	.29

As before pointed out, to secure a semi-steel well adapted for magnetic purposes the metal must have a high silicon content and a low carbon content and very little of the carbon must be in the combined state. In the semi-steel of our invention, the silicon content compared with other semi-steels is very high and the metal is very low in carbon for a cupola metal, while possessing a minimum amount of combined carbon, most of the carbon present being in the graphitic state.

While we have described our invention more particularly with reference to its elcetrical and magnetic properties, the metal is applicable to any of the arts where it is desirable to produce a cast or cupola metal of superior strength and capable of being readily tooled. The transverse breaking stress of this metal greatly exceeds that of cast iron and also that of semi-steels of the prior art. Two bars of the metal of the present invention when tested for transverse breaking stress ran 3,910 pounds and 3,900 pounds. Two bars of the standard make of semi-steel of the prior art broke at 3,262 and 3,160 pounds. A good cast iron will seldom reach 2,400 pounds under the same conditions. These specimens were broken on 12-inch centers.

In casting the metal it is desirable to utilize each day the sprues from the previous day's casting. In passing through the cupola and the casting the carbon and the silicon in the metal comprising the sprues are oxidized to some extent, and in consequence in utilizing these sprues they must be enriched to such an extent that when mixed in the cupola the alloy will have about the composition of the mixture of 45 per cent steel and 55 per cent ferro-silicon iron. This is accomplished by mixing with the quantity of steel a little larger quantity of ferro-silicon iron and a very small amount of soft iron to raise the carbon content and thus compensate for the loss due to oxidation.

In practice we have used, say, 18 pounds of soft foundry iron, such as sterling Scotch, 655 pounds of the ferro-silicon iron, such as flaky Ashland, 298 pounds of steel, and 529 pounds of sprues. The analysis of several specimens of sterling Scotch iron give the following proportions:

Silicon	2.07	3.13
Sulphur	.028	.019
Phosphorus	.256	.242
Manganese	.780	.34
Graphitic carbon	3.50	3.63
Combined carbon	.12	.22

It is a matter of simple calculation to vary the weights in order to utilize the amounts of sprues to be charged. The utilization of the sprues is based on the principle that two irons of identical or very nearly identical composition will have practically the same qualities when worked under like conditions. It is therefore the object to provide the same proportion of constituents in the mixture of steel, ferro-silicon iron, and sprues as would be present in the mixture of steel and ferro-silicon iron in the absence of the sprues, and the deficiency of carbon in the sprues is supplied by the addition of a small quantity of soft foundry iron, while the deficiency of silicon is supplied by increasing the amount of the ferro-silicon charge. By the term "cupola metal," as employed herein is meant such metal as is mixed and melted in a furnace known in the art as a "cupola" or in one having the same effect upon the metal as the cupola as now constructed. Steel is not a cupola metal, since it cannot be melted in a cupola and cast with success.

In practicing our invention we have used a mild steel of from .3 to .5 per cent carbon, such as rail steel. However, other low carbon metals may be utilized, whether they may be made by the open-hearth or Bessemer or other types of furnace. We have used metal of considerably lower carbon content with success, but prefer to use rail steel on account of its cheapness and convenient bulk. The word "steel" as used herein is to be interpreted as referring to any low carbon metal of analogous composition to the metal known as "Bessemer steel."

ALABAMA STEEL AND WIRE CO.

On Tuesday, Nov. 1, the project for a rod, wire and wire nail plant in the Birmingham district took definite shape in the letting of a contract by the Alabama Steel & Wire Co. to the Garrett-Cromwell Engineering Co. for the erection of a twin rod mill. The plant will be located at Ensley, Ala., closely adjoining the basic open-hearth steel mill of the Alabama Steel & Shipbuilding Co., which is now well under way. Twenty acres of land have been acquired by the new wire company from the Tennessee Coal, Iron & Railroad Co., of which, as is well known, the steel company is a closely identified interest. The Alabama Steel & Wire Co. has just been incorporated under the laws of Alabama with a capital of $2,000,000. Its officers will be: E. T. Schuler, of Chicago, president; C. E. Robinson, of Joliet, Ill., vice-president and general manager, and G. H. Schuler, of Cleveland, secretary and treasurer. The new president was treasurer of the Consolidated Steel & Wire Co., and later of the American Steel & Wire Co. Mr Robinson was manager of the Illinois works of the Consolidated Steel & Wire Co., and was elected general manager of the American Steel & Wire Co., but did not accept the position. G. H. Schuler was manager of the Consolidated Steel & Wire Co.'s Cleveland mill and later was in charge of the five other mills of the American Steel & Wire Co., but resigned this position a short time ago.

The new rod mill at Ensley, on which work will begin at once, will have an output of 600 tons a day, and the plans are such that with a slight change the capacity can be increased to 900 tons in 24 hours. There will be several new features in construction and equipment. Hot billets will be furnished direct from the adjoining steel works, and it need hardly be said that under the advantageous arrangement made with the steel mill, with the low priced fuel from mines close by and the cheaper labor of the Birmingham district, added to the economies secured by the most advanced equipment, a low cost of manufacture will be attained, an advantage amounting to at least $2 a ton, speaking roundly.

It is not expected that the new plant will interfere with wire and nail mills already operated in this country. Its chief field is the export trade; and the possibilities of low through freights via near-by tide-water points have been well demonstrated in connection with the export trade in pig iron from the Alabama district. Heretofore rod mills have paid from $2 to $3 a ton more for basic than for Bessemer billets. While nothing official is given out on the subject, it may be reckoned that the soft and readily workable steel of the basic furnaces at Ensley will be available at a figure more than wiping out the differential, and that the price at which Alabama rods, wire and wire nails can be laid down at European ports and in Asiatic markets is a figure not yet reached by English and Continental makers. It is planned to start the new mill in June, 1899.

LAKE SUPERIOR IRON MINES.

The Biwabik mine on the Mesabi range has closed down, after shipping about 425,000 tons. The Fayal, Genoa, Pillsbury, Penobscot, and Sparta were active last week, but the Pillsbury alone is reported in operation now. It is reported that shipments yet to be made from D. M. & N. docks are 100,000 tons.

The Corsica Iron Co., capital $50,000, has been incorporated at St. Paul by C. P. Coffin and L. T. Beecher, of Evanston, Ill., and J. H. Chandler, of Chicago. It is subsidiary to the Minnesota Iron Co. The mine property is known as 18-58-16, and is located near McKinley, Minn.

The group of non-Bessemer properties at Crystal Falls, Mich.,—the Crystal Falls, Great Western, Lincoln and Lamont, will be operated by Corrigan, McKinney & Co. the coming winter. This firm has recently acquired the Great Western and in conjunction with the Lincoln, which adjoins, will start up at once, the unwatering of the two being a single proposition. These Crystal Falls ores are for the most part high in phosphorus and are of a class for which the market has shown an increasing demand of late. A scarcity of labor is reported at Crystal Falls. With four mines operating there was a shortage, and now that three others are to start 500 more men will be needed.

The Columbia mine, Menominee range, is planning for a large output next year—in the neighborhood of 200,000 tons. The new shaft is ready for the skips and a new 250 h. p. boiler and a new pump have been installed.

Concerning the ore outlook from the standpoint of the Lake Superior mining country, *Iron Ore*, of Ishpeming, Mich., makes this comment: "Now there appears to be a desire on the part of the Mesabi producers to try for better prices, and if they come into the list of those who have been working for living figures then we ought to be able to do a little better the coming year than we have for the past few. There is also a better prospect for the non-Bessemer ores, and it is suggested that there may be an understanding between producers of ores of this class so that a better price may be obtained. The difference in the cost of mining the good and the poor ore is nothing, the one costing as much as the other, but there is a great difference in the selling price. It is said that there is a better demand for iron springing up and that next year will see a stimulated action in this class of ores. The taking of from 10,000,000 to 15,000,000 tons of ore from the Michigan and Minnesota mines each year leaves a sad scar. The hole is an immense one; there is no ore being put into the mines to take the place of that sent away. Nature is making no provision for a restocking to take the place of the depleted deposits. The time is not far distant when the mines of rich Bessemer ores will be exhausted, and then the non-Bessemers will have to be drawn upon, the basic or some other process being used to secure the desired steel. New mines of iron ore do not come so readily as new mines of copper, and the yearly extraction of from 200,000 to 800,000 tons of ore from a single property lessens the main store not a little. The drain is an enormous one, and while the ore is spoken of as miles in length in the new field in Minnesota it soon melts under the work of the steam shovel. These big deposits are not all fat. There are many lean streaks. It is important that the miner secure something for his labor and investment while the work of mining is going on. Each added year lessens his capital stock considerably."

During the year ending Sept. 30, the mines of Dickinson County, Mich., produced 1,726,465 tons of ore, according to information furnished Inspector Trestrail by the several companies. The shipments for the season are in excess of those of last season, when the total shipped from the Menominee range was 1,937,013 tons. The following table is from the inspector's annual report: Chapin Mining Co., 698,976 ons; Antoine Ore Co., 93,100; Dessau Co., 14,810; Pewabic Co. 329,899; Cundy Co., 70,000; Penn Co., 168,461, Aragon Iron Co., 289,000; Loretto Iron Co., 62,219; explorations, 100. Total, 1,726,465 tons. During the same period there were 2,470 men employed underground and on the surface by the several companies, as follows: Chapin, 730; Antoine, 112; Millie, 45; Pewabic, 326; Walpole, 38; Concentrating works, 52; Cundy, 88; Norway, 14; Cyclops, 7; Aragon, 521; Curry, 1; West Vulcan, 318; East Vulcan, 1; Loretto, 135; explorations, 32. Total, 2,470.

RECEIVED FROM THE TRADE.

The 1898 catalogue of the Skinner Chuck Co., of New Britain, Conn., emphasizes, even at a casual glance, the great variety of chucks manufactured by the company. Since the publication of its last catalogue, the company has added to its list its "1898 patent" independent lathe chuck and has made important improvements upon its patterns of universal and combination lathe chucks. It is noted that the demand for the company's chucks has increased year by year. The "1891 patent" independent lathe chuck has first place, as in preceding catalogues. Its design gives great strength, the body being made of one casting. The jaws are each made with a full nut from a steel drop-forging and are reversible in all sizes. They are ground on the steps, in the chuck, after being case-hardened. A powerful grip is secured through a fine thread on the jaw screws. The hub in the center of the chuck is hardened and receives the end thrust of the jaw screws, when work is held on the outside bite of the jaws. The "1898 patent" lathe chuck was designed to do the heaviest class of work. It is heavy, well proportioned in all parts and exceptionally strong. The pamphlet also illustrates and describes the Skinner drill chucks and planer chucks.

The second edition of the general catalogue of the Whiting Foundry Equipment Co. is made attractive by a liberal use of half-tones showing the great variety of equipment manufactured by the company, and interior views of foundries in which its appliances have been installed. Additional details concerning the Whiting cranes, cupolas, air hoists and the Avery molding machines are contained in special catalogues. The shops of the company at Harvey, Ill., are of modern construction and well equipped, electricity and compressed air being employed for the economical handling of product. In addition to the specialties named above, the general catalogue illustrates a variety of ladles, belt power elevators, cars and trucks, buckets and bucket trucks, turn tables, tramways, rumblers, brass foundry equipment, and the Whiting patent car wheel foundry system.

The report in Chicago papers concerning the two new blast furnaces to be built by the Illinois Steel Co. is at least premature. No plans have been formulated and it may be some time before the idea is carried out.

W. S. Rockwell & Co., New York, have recently installed at the Pennsylvania Boiler Works, Erie, Pa., six of their improved oil rivet heating furnaces and their improved duplex system for burning fuel oil to operate them.

The Midland Steel Co., of Muncie, Ind., has placed an order with A. H. Barber Mfg. Co., 229 South Water st., Chicago, for a 150 h. p. Miller gas engine. The engine will be used for rolling mill work, finishing steel sheets, and is the first gas engine built for such service in the country.

The Morgan Construction Co., of Worcester, Mass., has recently received an order from Jones & Laughlins, Ltd., of Pittsburg, for two more improved merchant mills.

The Wall Street campaign on Federal Steel Co.'s stock has been well begun. The preferred stock advanced to 71⅛ in the latter part of last week and common was firm at 30, with transactions in both. It is stated that the company will be in position to begin dividends at once, and that there will be declared 6 per cent a year on preferred and 4 per cent a year on the common stock.

The Buffalo, N. Y., molders have secured the signatures of three additional foundries to their agreement, leaving only the Snow Steam Pump Co., who have not acceded to the new terms. Only 30 molders are now out. The demand was for a minimum rate of $2 25 a day and the arbritration of disputed questions.

At New Castle, Pa., the wire nail department of the New Castle Wire Nail Co. was shut down this week by a strike of 70 helpers against the substitution of piece work for day work.

Review of the Technical Press.

Translation, Condensation and Comment expressly for The Iron Trade Review by Dr. Richard Moldenke]

The Micro-Chemistry of Cementation. [*Ironmonger*, Sept. 10.]—Prof. Arnold read a paper on this subject before the Iron and Steel Institute. Those interested in "blister" steel will find it of special value. The bars experimented upon were converted in two pots each holding 13 tons of steel and using 200 bushels of charcoal per heat as a packing. For firing about 15 tons of coal per heat are consumed, a mild heat requiring about 8 days, medium 9½ days, and the hard heats about 11 days. The furnace is allowed to cool gradually, the cooling period extending over 14 days. The temperature reached at the end of the conversion is about 1,825 degrees F. The grades of the bars as they come into the market are from No. 2 to 6, and an extra grade which has been doubly converted is called "glazed." The old No. 1, now obsolete on account of the modern processes of making mild steel, contained about .30 carbon. The bars are sorted by the eye, considerable expertness being acquired in judging the carbon contents by those engaged in this work. A Swedish Lancashire hearth bar iron made from Dannemora pig was converted into the several grades. The silicon ran .037, sulphur .006, manganese .108, phosphorus .012, and there was .007 arsenic present also besides a trace of copper. The carbon was about .05. The resulting bars were planed in cuts of .04 inch thickness, six samples being obtained from outside to center, and in this way the depth of penetration and the amount of carbon entering the bars could be found, and the microstructure ascertained. Bar No. 2 has .10 carbon in the center and .98 in the surface; bar No. 3 .88 carbon in the center and 1.40 in the skin; bar No. 4 similarly 1.15 and 1.50; bar No. 5 was uniformly regular in its carbon contents throughout, the average being 1.60; bar No. 6 similarly 1.80. The glazed or double converted bar ran slightly over 2 per cent in carbon. Occasionally something happens to the pots and a current of air reaches the bars. This invariably means a loss of carbon in the skin, in the case cited none remained there. The results are summed up by Prof. Arnold as follows: The saturation point, 0.9 per cent carbon, of steel can be reached in bars of iron at a temperature of 1,475 degrees F. To produce the higher numbers which are super-saturated a temperature of 1,750 degrees F. must be maintained in the pots. The smaller the bars the quicker the saturation point is reached, but super-saturation is slow thereafter.

Testing Cast Iron. [*Stahl und Eisen*, 17-19.]—The recent action of the American Foundrymen's Association in appointing a committee on standardizing the testing of cast iron is attracting some attention in Europe. Usually such movements emanate from engineering and other scientific societies, and the natural inference would be that they are directed for better protection of consumers of articles, as against those furnishing them. In this case the producers themselves, realizing that the modern tendency in the production of castings is toward better methods and results, take time by the forelock and, while in no way hampering individual action, approve of a more systematic study, from their standpoint as foundrymen, of the behavior of the metal they deal with, when used to represent finished work. This movement, which is in no way to conflict with those already made by other bodies, was the outcome of a resolution presented at the Cincinnati meeting last June by the reviewer, in a paper widely published at the time. It will be remembered that the style of test bar embodying a contraction was suggested for the consideration of the proposed committee with a view of learning whether it would prove of any value. Two famous scientists of Germany discuss the paper above referred to: Prof. Ledebur, of the Royal Mining School, at Freiberg, Saxony, an authority on the metallurgy of iron, and Prof. Martens, director of the Royal Testing Institute Berlin, whose recent excellent treatise on the methods of testing practically exhausts the subject and leaves nothing for anyone else to write for many years to come. Prof. Ledebur, whose knowledge of metallurgy is of a very practical nature, readily concedes the objections advanced against the continental method of testing cast iron. This method, it will be remembered, calls for a bar about 1 1-5 in. square and 44 inches long, which is broken transversely and then the broken pieces are turned down to four-fifths in. in diameter and tested for tensile strength. Prof. Martens, through whose courtesy, as well as Dr. Wedding's, the reviewer obtained this information, adds that while the methods described had been adopted as a consequence of the recommendations of a number of conferences presided over by the late Prof. Bauschinger, yet they are by no means adopted universally and in fact were continually supplemented by himself and others by impact and punching tests. In justice to Prof. Martens, it may be said that this is the case, and that the reports of these conferences were afterwards obtained through our own government and found fully to bear out the description published.

That this method of testing is not adopted universally, the reviewer is glad to see, for he fully concurs in the statement of Prof. Ledebur that "also for German conditions it is advisable to introduce more definite methods of testing cast iron than exist at the present time." These methods, differing from the above, and required by the Iron Institute of Germany, are given as follows: For pipe, structural and machine castings, a tensile strength of 17,000 lbs per sq. in. is required, no specifications regarding the shape, size and condition of the bar being given, nor whether it is to be machined or not. The bending test requires that a bar 39.36 in. between supports and 1¼ in. square and not machined, shall support a gradually applied load of 9,900 lbs. before breaking. Prof. Ledebur rightly adds that the deflection should be specified, for anyone having experience with high phosphorus irons knows how easily this iron will bear the weight when applied slowly, but breaks under a comparatively light blow. He further advises a chemical specification to limit injurious constituents, quoting the well known limits of 0.1 to 1.5 per cent of phosphorus in castings we run across daily. Prof. Ledebur concludes by stating how difficult it really is to properly specify the composition of cast iron in the absence of reliable data bearing on this subject. We echo this statement in America, but hope to assist in clearing up the mystery to some extent. Prof. Martens goes into the rationale of testing cast iron, discussing the paper by the reviewer and its criticism by Prof. Ledebur. He claims that the turning down of the square bars to smaller round ones is not dangerous so far as making four hard and four soft portions in the circumference of the bar is concerned, except in castings inclined to run white, for one-fifth inch has been removed from even the sides of the square bar in reducing it from 1.2 inch square down to .8 inch in diameter.

With this the reviewer disagrees entirely, for cast iron is so sensitive to changes in temperature that even with very soft irons a variation in fracture not readily detected with the eye shows marked differences in the combined and graphite carbon contents as well as size of crystal from skin to center, all of which must affect the results sufficiently to make them at least open to doubt. Moreover, in pouring a bar of some 40 inches only 1 1-5 inch square, every founder knows that the iron at the end of that bar is cooler when it gets there than that at the gate, and in addition to this the iron at the upper side of the bar is also cooler than that on the under side, with consequent variations in the strength of the bar tested bottom up or top up. Prof. Martens instances the difficulties attending a proper tensile test, and is perfectly right in this respect, for the bending test is very much easier to carry out. Yet a testing system should provide for proper specifications for all kinds of tests, so that he who wishes may choose that best adapted for his purpose. Prof. Martens rather deprecates the requirements of chemical specifications, as he fears it will cause endless trouble to the founder without adequate returns, the physical method of testing the iron being sufficient to obtain serviceable material. This may be left as an open question, for when we come to understand the peculiar effects of phosphorus and sulphur more thoroughly we may be in position to act with a better understanding. Prof. Martens advocates an impact test, which we in America also think favorably of, a special committee having been appointed by the American Section of the International Society for Testing Materials to report upon the status of this method of testing. Yet we are met with the objection that cast iron is never subjected to impact in actual service. On the whole, the recommendations of both Prof. Ledebur and Prof. Martens, that further critical studies on the behavior of cast iron be made, can only be fully concurred in.

NEW HULETT COAL UNLOADER.

The coal unloader recently completed by the Webster, Camp & Lane Machine Co., of Akron, O., for the Rochester & Pittsburg Coal & Iron Co., on the latter company's Ganson st. docks at Buffalo, N. Y., embodies many radical improvements over other unloaders designed and patented by its inventor, Mr. Hulett. This machine was designed especially with a view to transferring coal from cars to boat with the least possible breakage obtainable, with rapid handling and without any increase in the number of men necessary to operate it. The results have been all that were expected.

In this machine the loaded coal car is drawn up in the cradle by a disappearing car or dilly. Fig. 1 shows the cradle or platform in its normal position, with the car in place. The cradle is then turned upon a pivot until the car is inverted to the proper angle—about as shown in Fig. 2. As the cradle is revolved, the car, which is mounted on a movable track, moves over against the side of the cradle and rests securely against it. When the car is inverted it requires no side clamps to hold it in place. It is prevented from tipping off the cradle by chains clearly shown in the illustration, passing over the top of the car. To the free ends of these chains counter-weights are attached of sufficient weight to hold the car against the cradle; these counter-weights being shown well in Fig. 2, at the left side. The clamping is thus entirely automatic and is all that is required

As the car is being inverted, the coal slides out of the car into a hood. There is no drop from the car to this hood. After the car is inverted, doors in the end of this hood are opened and coal flows into the two buckets shown in the illustration; in this case the buckets are of 22 tons capacity each.

The lower end of these buckets for a distance of 12 ft. from the bottom, are 5 in. 6 ft. by 8 ft. in size, so they can be lowered for 12 ft. through the hatches of small boats, and will go to the bottom of large boats having hatches more than 15 ft. long. The bottoms of the buckets are drawn up through the shell of the buckets and as the coal flows into them from the car, the bottom is lowered, as the bucket fills with very little if any drop from the car to buckets.

Two conveyors are provided, one for each bucket, and while the empty car is being unloaded and run off and another car run on, the buckets are hoisted, run out over the boat, as shown in Fig. 1, and lowered through the hatch, until close to the bottom, when, by holding the shell with one drum and lowering the bottom of the bucket by the other, the coal flows out of the bottom of the bucket, as appears in the outline illustration Fig. 3. The conveyors are hinged just outside of the mast, so that they can be raised when moving the vessel, and the entire conveyor being pivoted at the rear end of the structure is arranged to swing, to adjust conveyors to hatches of different centers.

There are being buckets and two conveyors, no time is lost and no men are required in hooking or unhooking buckets. Four men are needed in the operation of this machine, one fireman or engineer and three lever men. As two hatches are filled at one time, the boat is only moved half as many times as is the case where a single chute is used. The buckets also act as trimmers, distributing the coal well across the boat, and delivering it so evenly and gradually that the breakage is reduced to a minimum.

The average speed of loading is about the same as that of other car dumpers in use, depending largely on the class of boats loaded and the amount of trimming required.

FIG. 1.—HULETT COAL UNLOADER. CRADLE IN NORMAL POSITION.

It has been the study, in designing this machine, to combine all the qualities desired in coal unloaders, namely, maximum speed of operation consistent with careful handling of the coal, minimum quantity of labor required and consequent economy of operation, together with freedom from derangement and vexatious delays incident to expensive and complicated machinery.

Guaranty Storage Warrant Co.

The Guaranty Storage Warrant Co., 620, 189 LaSalle st., Chicago, has issued a pamphlet describing its methods of issuing storage warrants. The company, incorporated under the laws of Illionis, in 1884, as the Hales & Curtis Malting Co., operated a malting plant and conducted a grain storage business until Oct., 1897, when it sold its malting plant and recently its name has been changed to Guaranty Storage Warrant Co., with enlarged charter privileges. The business will be continued by the same management as heretofore, with the addition of the services of W. H. Banks and F. B. Potwin, who were connected with the National Storage Co.,

Mr. Banks for nine years, and Mr. Potwin as his assistant for six years. The business of the company is the storage of all classes of property, deposited upon premises leased by the owner to the warrant company. The volume of business has been received principally from blast furnaces, lead and iron mines, transportation docks, rolling mills, foundries, tin plate mills, smelting and refining works, lumber mills and yards, cotton and woolen mills, tanneries, flour mills, grain and malt elevators, packing houses, implement factories, linseed and oil mills, tobacco warehouses and canneries. The company, in behalf of bankers and others who may desire valuations for raw materials, manufactured stocks and merchandise, for purposes of ascertaining the safe loaning values, offers to furnish samples and market quotations of the property covered by its warrants, or of property which parties may desire to have covered by them. Certified appraisals by experts in the various commodities covered by warrants, verifying the written reports, will also be furnished.

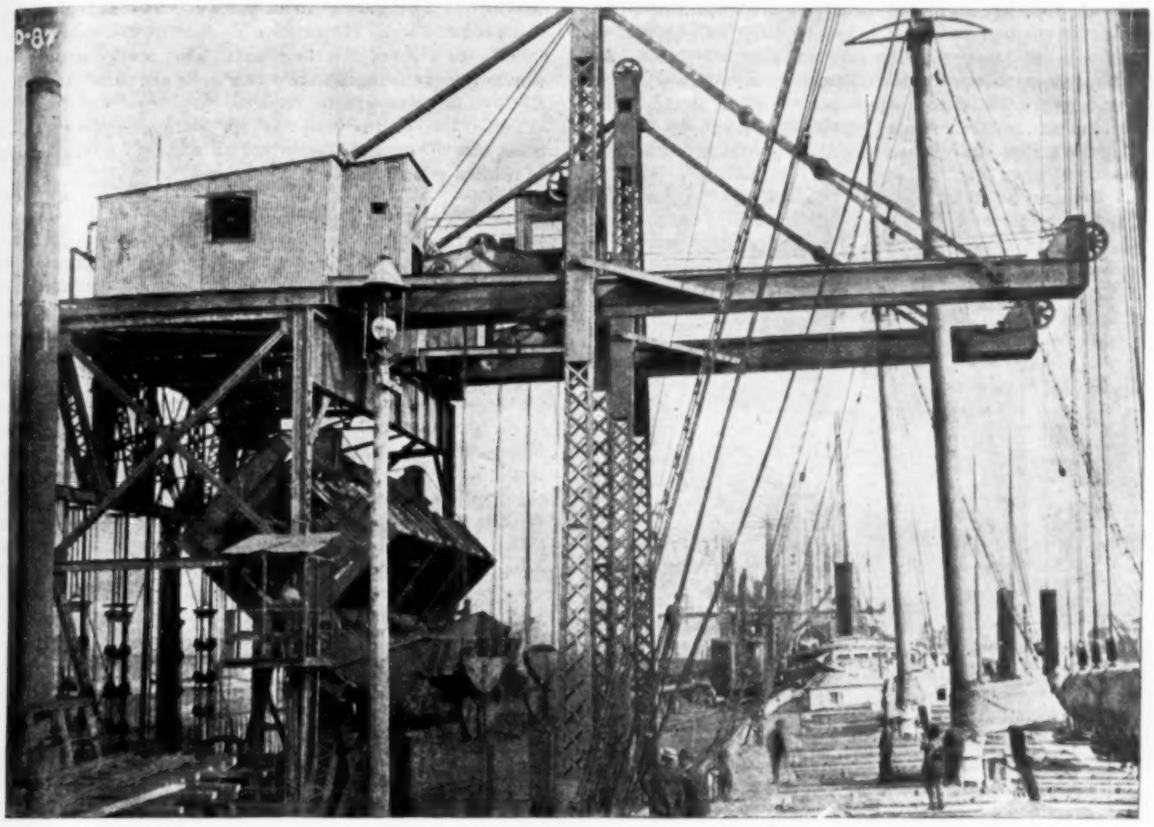


FIG. 2.—HULETT COAL UNLOADER, SHOWING CAR INVERTED.

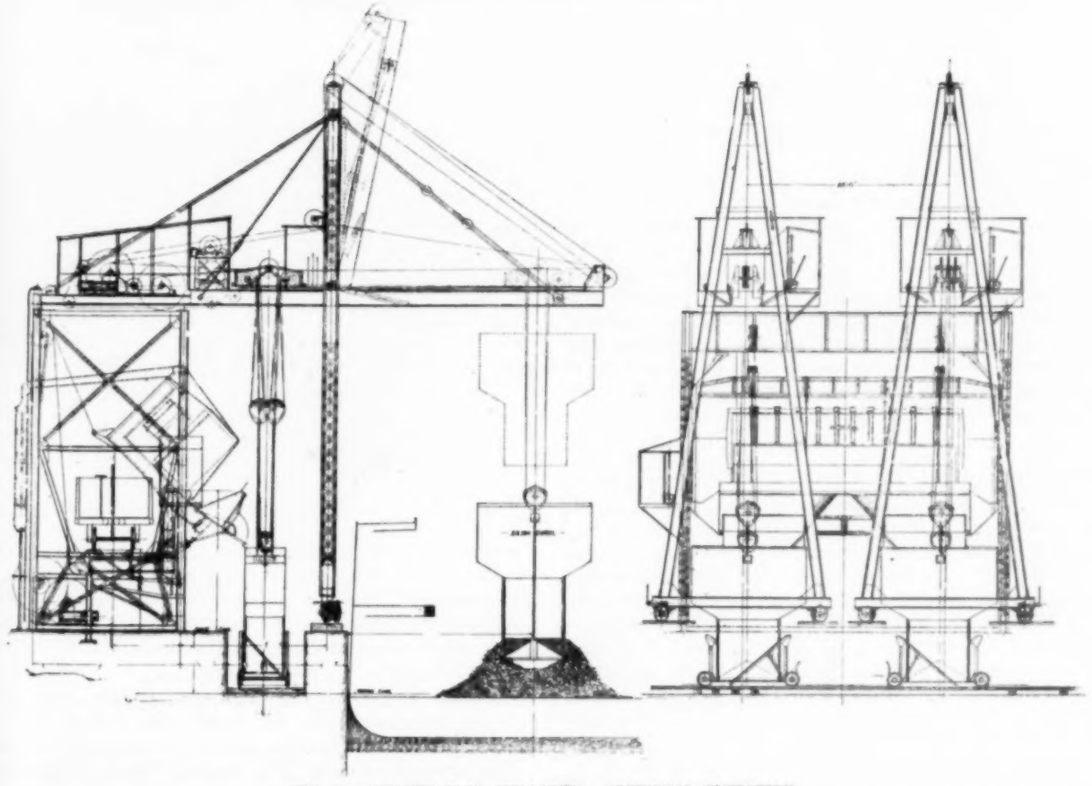


FIG. 3.—HULETT COAL UNLOADER. SECTIONAL ELEVATION.

HOLDER FOR INCANDESCENT LAMPS.

A convenient shop electric light which can be so placed that the light shines exactly where wanted is secured by the use of the magnetic lamp holder for which Jenkins Bros., of New York, are sole agents. The holder is used where the direct current is employed. Being magnetic they will adhere to iron and steel in any position in which they are placed. In machine shops they are useful in connection with work upon lathes, planers, drills and other tools. In boiler shops the magnetic holder does away with torches, as it can be carried inside the boiler. In railroad shops it is particularly useful in

repairing locomotives, as its position may be changed at will. There are other places where a portable magnetic holder will be found useful—engine and boiler room, abroad steamships and steamboats; about elevators when making repairs; in mines, basements, cellars, bank vaults, in all places where light is needed. Its use eliminates the dangers from using candles or torches, as it is impossible for it to set fire to anything, so that insurance risks are reduced. The holder is made for Edison, Westinghouse and Thomson-Houston lamps.

Connellsville Coke Output Increasing.

Connellsville coke production has been gaining of late, the production in the week ending Oct. 22 being estimated at 152,000 tons, as compared with 147,000 tons the week previous. The shipments were 8,695 cars, an increase of 110 cars. The scarcity of cars is felt by all producers. The firing up of several hundred ovens marked the week, raising the number active to 14,661, as reported by producing companies. Prices of coke are unchanged. Furnace coke is $1.50, though furnace contracts now running are below that figure. For 1899, it is expected that furnacemen will contract on substantially to-day's basis. Foundry coke ranges in price from $1.75 to $2, for the Connellsville product, cokes from other districts and from the borders of the Connellsville field shading these figures.

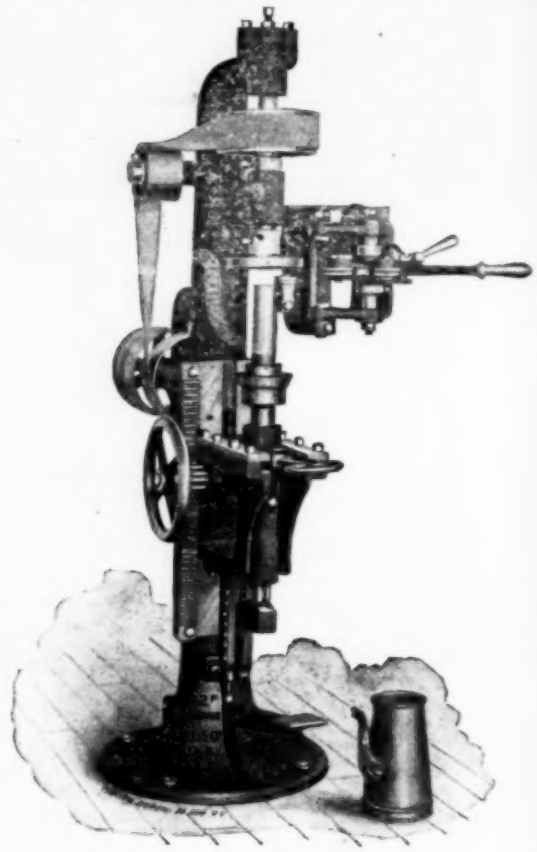
Combined Annealing Furnace and Gas Producer.

A new style of annealing furnace has been in uce at the works of the Humbert Tin Plate Co., South Connellsville, Pa., for something over a month, the results from which have been very satisfactory. The furnace is really an annealing furnace and gas producer combined, the design being such however, that no more space is required than for the ordinary coal-fired furnace, while the cost is no greater. On account of the employment of the gas producer principle, there is a decided saving in coal over the ordinary style of furnace, the combustion being perfect. This fact is shown by the entire absence of coke in the ash pit, the coal being all perfectly burned. The furnace, which was designed and erected by E. E. Erikson, of Pittsburg, is equally applicable for annealing tin plate and sheet iron. The roof is level and air ports are provided at intervals, so that the heat can be regulated perfectly and maintained the same in all parts of the furnace, avoiding all danger of burning any of the boxes.

The additional furnace was necessitated by the increase in the plant of the Humbert Tin Plate Co. from four to six mills. Although the furnace has been in operation for more than a month, the two additional mills will not be completed for some little time yet, and the favorable results obtained have decided the management to have the two old annealing furnaces remodeled by Mr. Erikson, to conform as closely as possible to the style of the new one. This work can be conveniently done before the two new mills are completed, when all three furnaces will be required to anneal the increased output. The ordinary size of tin plate annealing furnace takes care of the black and white annealing for the product of two hot mills.

SPECIAL DOUBLE SEAMING MACHINE.

A double seaming machine has been built by the E. W. Bliss Co., 6 Adams st., Brooklyn, N. Y., designed for double seaming "flat bottoms" on tea kettles, coffee pots, pails, oil cans, and similar goods in the tin and ironware lines, and also for other work of a like nature. The machine as shown is supplied with a sliding table and a special roller support for double seaming rolls, for use in connection with the small inside pressure roll usually employed for seaming articles where the seam comes in the center, or at any given distance from the bottom. Sometimes instead of using the small inside roll as illustrated, a collapsible chuck is used, which spreads out so as to fill along the edge of the bottom when the article to be double seamed is carried up against the upper chuck, and folds together after the work is done, so as to permit of easily taking off the seamed article. This style of chuck is largely used for buckets, cups and other straight sided



articles; also for pitchers, kettles, coffee pots, tea pots, etc.

The weight of the machine illustrated is about 600 lbs., but a larger size is made, weighing about 1,450 lbs. The adjustment for different heights of work is effected by means of the hand wheel shown at the left of the machine.

A CARGO of 2,560 tons of ore from Santiago de Cuba arrived at Sparrow's Point, Md., last week. The Cubans, it is said, refuse to work in the mines and only 150 natives are employed, though 500 are needed. Negroes from Jamaica are being imported by the mining companies.

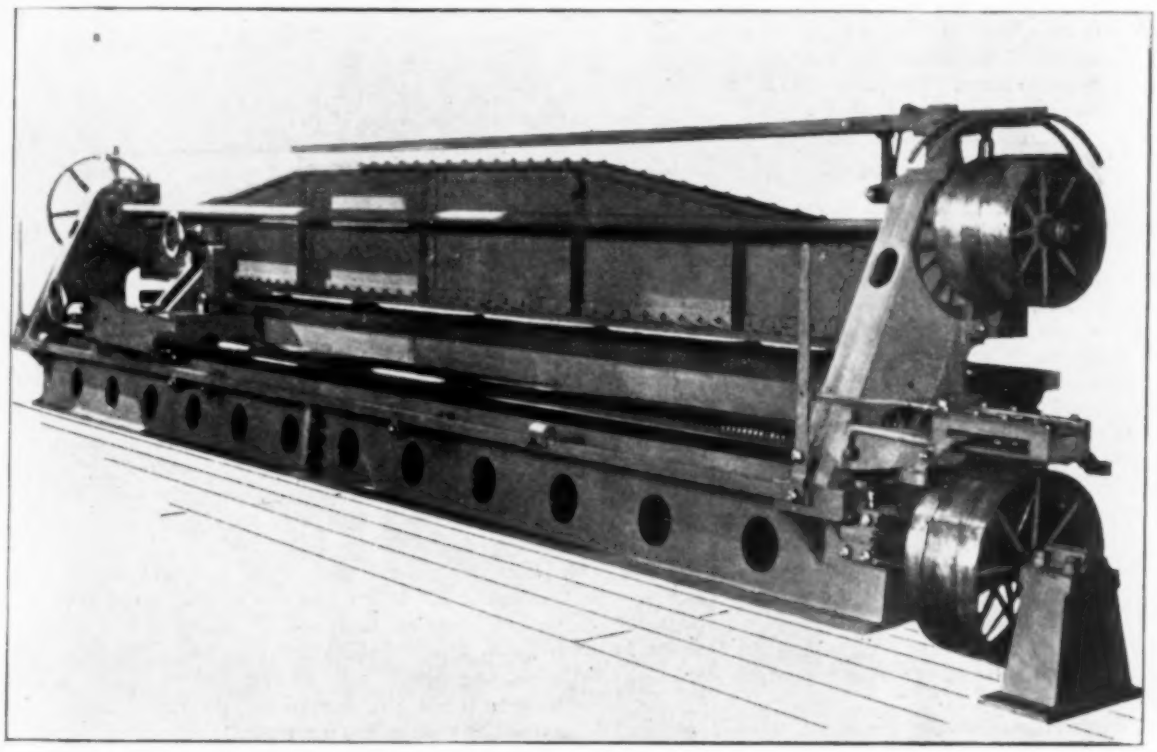
ROBERT W. HUNT & Co.'s bureau of inspection and tests has removed its New York office from 80 Broadway to the new Empire Bldg., 71 Broadway.

A HEAVY PLATE PLANER.

The illustration shows a new plate planer built by the Cleveland Punch & Shear Works Co., of Cleveland, and just shipped to Stockholm, Sweden, on an order taken by Hill, Clarke & Co., of Boston. The machine is capable of planing plates 20 feet long at one setting and of any length by shifting and resetting, and from the thinnest plates up to three inches thick. The tool holder carries two tools which are arranged to cut in either direction. Plates up to 1¼ inches thick are planed by a broad tool wide enough to take the full thickness of the plate. For thicker plates the up-and-down feed is used feeding across the edge of the plate. The shifting of the tool holder is accomplished automatically by the belt shifter. The saddle carrying the tool holder is driven by a square-thread steel screw four inches in diameter, working in a bronze nut, the end thrust of which is taken by ball bearings in both directions.

The girder for clamping the plate is built up of steel plates and angles. A separate belt is used for raising or lowering this girder; and to prevent braking an automatic belt-shifting device is used to shift the belt after the girder is brought down upon the plate. The final pressure is put upon the plate by the hand-wheel shown at the left of the machine. The shifter also shifts the belt at the highest point to which the girder is intended to travel. A roller table is provided at the back of the bed of the machine to facilitate the handling of heavy plates. The weight of the planer boxed for ocean shipment is 33,000 pounds. It is not only a powerfully built machine but does the work rapidly. It planes either straight or bevel.

The manufacturers note a growing export trade for their machinery, much of which is built on special orders.



A HEAVY PLATE PLANER.

Relative Corrosion of Iron and Steel.

In answer to a query regarding the relative corrosion of iron and steel, L. M. Hastings, city engineer of Cambridge, Mass., writes the *Engineering News* calling attention to his discussion of this subject in connection with the paper of Prof. A. H. Sabin before the American Society of Civil Engineers in December, 1896. He adds that the plates of iron and steel which he referred to in that discussion have been examined recently, after two years' exposure, and the results are as originally reported — that iron is more subject to corrosion than steel. The *Engineering News* thus summarizes the original statements:

"In the discussion referred to, Mr. Hastings tells how he practically tested the effect of water and soil upon uncoated and protected plates of stele, wrought iron and cast iron, and gives the results. Taking the uncoated plates alone, we find those of steel and wrought iron were 6 to 10 in. square and $\frac{5}{16}$ in. thick; the cast iron was about 1 in. thick. These plates were carefully weighed and placed in the water in the pump conduit. This was a mixture of brook and pond water, fairly soft and containing comparatively little acid. After one year's immersion the plates were examined on Oct. 8, 1896. The two uncoated wrought iron plates were badly tuberculated and rusted and one of them was 'the worst in the lot.' The two uncoated steel plates were rusty and tuberculated but 'not so badly as iron.' The uncoated cast iron plates were badly rusted and tuberculated. The percentages in increase of weight due to corrosion were as follows: For the two wrought iron plates, 1.5 and 3.1 per cent.; the two steel plates, 1.1 and 2.1 per cent; the two cast iron plates, 1.0 and 0.96 per cent. The wrought iron plates buried in sand and in clay also showed greater increase in weight than steel plates similarly placed. Mr. Hastings concludes that, subjected to the action of water, unprotected plate iron was affected the most; steel plate to a less degree, and the cast iron least of all."

THE patent litigation concerning the use of aluminum in the manufacture of steel, which has been in the courts nearly four years, has been decided in favor of the United States Mitis Co., complainants, against the Carnegie Steel Co., Ltd. The Carnegie company appealed from the decision of the lower court, which enjoined it from using the patent, and now that the Court of Appeals has upheld that finding it is said that the Carnegie company has taken a license under the patent and made settlement for past use.

IMPORTS of American iron and steel products and machinery into Germany are being commented on by the press of that country. In 1895 Germany took raw iron and steel and manufactured goods and machinery to the value of about 4,500,000 marks; in 1897 these imports into Germany exceeded three times this amount. In 1895 the import of American machinery amounted to 2,761 tons, valued at 1,600,000 marks; in 1896, 5,213 tons, worth 3,000,000 marks; in 1897, 9,593 tons, worth 5,500,000 marks, and Germany has taken in the first seven months of 1898 12,570 tons of machinery from the United States.

THE Duluth & Iron Range Road is building a new coal dock at Two Harbors.

GIRLS AS CORE-MAKERS.

BY E. H. PALMER.

Seeing articles under the above, and various other headings in different papers, regarding the girls, as compared with boys, for this kind of work, your correspondent called on a number of different firms, and being very courteously received, was shown the core rooms with conveniences supplied, and was given permission to use the names of the firms, in an article on the subject. So will ask the reader to imagine himself taking a trip with me to these foundries and compare the work, amount turned out, wages paid, time worked, and let us see if it is not a proper line of work for a girl who must earn her living, and if she will not hold her own with the boys.

Going to the office of the Rhode Island Malleable Iron Works, at Hills Grove, R. I., I was received very courteously by Mr. A. J. Allen, the superintendent, and on making known my errand, was taken by him to the girls' core-room, a light, airy building, built especially for the purpose, 40x20 feet. Arranged on the sides of the room were benches, and seated at those benches were eight girls and women of various ages, making cores Their bright, pleasant faces showed they enjoyed their work, and as one would hum some song which the rest would join in, it seemed to me they were certainly not a very discontented lot of girls. Every arrangement possible to facilitate their work and make them comfortable was at hand. At one end of the room was the core oven, filled with neat, nicely made cores. The oven was of Mr. Allen's design, built especially for the needs of the work, and as he has been with the firm about 31 years, you can judge it was just right, working very nicely, doing the work with about 50 pounds of coal per day.

In the center of the room were racks for holding cores, and core boxes of great variety. In one corner were bins of ready mixed core sand, the sand being mixed in the cellar, and brought and put in the bins for them. The room was nicely ventilated and curtained, while the floor was kept swept, and proper places arranged for keeping rods and nails in. There was a constant stream of cores going in and out of the oven. The girls at present employed have been with the firm from two months to five years and earn from 65 cents to $1.25 per day, according to ability displayed.

Mr. Allen said he thought his firm were the first to employ girls as coremakers in this State, as they tried the experiment in 1873, and had found it a paying experiment. An intelligent girl will in six months make a good coremaker. They had found the production of the girls was not less than one-third more than the amount produced by boys on the same kind of work. The girls were willing, taking an interest in their work and attending to and striving to produce work satisfactory to their employers.

There was no offensive odor in the room, unless one does not like the smell of molasses cooking. The girls were neatly dressed, each wearing a bib apron extending to bottom of dress. To their credit, the room was as neat a core room as I ever was in. They leave off coremaking about half an hour before bell time, and put the room in order ready for an early start the next morning, working ten hours per day. The plates used were light and of convenient size for their work. While standing there talking with Mr. Allen, I could not help wishing that the writer of an article published a short time ago was there. He evidently did not think very much of the girl coremaker, who, as he described her, was thumping core boxes covered with coal oil, and she covered with sharp sand, when she might be earning a great deal better wages doing house-work.

I found the large, heavy cores, were made in a separate coreroom by men. I saw the girls making cores requiring rodding, in special ways, and was told they soon caught the idea of what the rods were for, and in other cores than those on which they were shown what was required, rodded them satisfactorily, and as no man ever works in that room, I think you must allow the girls have some use for their brains besides looking over fashion plates.

My next call was on A. Carpenter & Sons Foundry Co., West Exchange st., Providence, R. I. I was pleasantly received by Mr. Henry Carpenter, of the firm, who informs me they have at present three girls, and expect next week to have six girls at work. The girls earn $6.50 to $6.65 per week, the work being done by the piece. The time worked is only eight hours per day, and that is the average time run. The work consists mainly of fittings for steam and gas pipe, although small cores are made by them. The following figures may interest some readers, familiar with pipe fittings, they being the number of cores made by one girl in eight hours:

1½-in. elbow cores, 650 to 700 per day—each core represents two castings.

1x¾x½-in. T-cores, 1,500.

1½x1½x½-in. T-cores, 1,200 to 1,500.

5x5x2½-in. T-cores, 90 to 100.

The sand is mixed in one corner of the room, by an arrangement of their own. Racks for cooling are arranged in the center of the room, and for core boxes on the sides, the girls passing between the racks going from bench to oven, which is on the opposite side of the room. The cores are inspected by Mr. A. W. Arnold, the foreman of the room, and placed in convenient sized boxes for the molder to handle, and number in box marked on a slip of paper put in a frame to hold it, on the end of the box, so at a glance Mr. A. knows just how many cores he has given the man. They certainly have a very fine system in their coreroom, and a very superior class of help. In this class of work cores are required to be round, a core that is flattened on either round is condemned.

The day before the one on which I was there the girls (three of them), had made and dried 5,600 cores, or an average of 1,866⅔ cores for each girl, I am informed by Mr. Arnold. There are two ovens, each requiring 150 pounds of coal to run it for 24 hours. The larger cores are put in at night and taken out in the morning. The coreroom is very nicely kept, and opening from it is the dressing room for the girls, fitted with modern conveniences, who leave and enter directly from this room to the street. Mr. Carpenter considers the production is greater than one-third more by girls than boys, while the foreman, Mr. Arnold, says the boys are not in it with the girls.

I saw Henry C. Bowen, of the late firm of H. C. Bowen, who in former years had been connected as partner with the firm of Carpenter & Bowen, and who was the prime mover in introducing girls into the coreroom. In speaking of his experience, he said: "When we first started girls working at coremaking there was a howl, the girls were no good; they could not compete with boys, but the girls, when given a fair trial, we found easy to learn, taking an interest in their work, remembering what they were told, and would keep going steadily at it. If any line was wanted, would take all interest to have it out on time, seldom losing a day unless through sickness, and in a short time they could distance, on the small cores, any class of help we ever had on it, and I am a firm believer in the girl coremaker on small cores. Our girls earned as high as $10 per week."

So you have the opinion of three firms, and their experience. Remember, in all of the above cases, rooms were fitted for the production of the work, mainly small cores They all had corerooms where the larger cores were made by men, no cores being made by the girls requiring them to lift heavy amounts, according to their strength. I think some of the firms producing medium and small castings will agree with me when I say in some shops, one of the departments of the foundry from which the least satisfaction is derived is the coreroom's production of small cores. Men working on large cores for heavy work and medium can see they are producing something; consequently they take pride in making a good core, but when it comes to the small cores it is, "get a boy to make them." Then the fun commences. How many times has a foreman in one of these shops making this small work had a molder come to him with, "They are behind hand on my cores," and on going into the coreroom has found the foreman of that department jacketing up some boy because his work was behind hand. The man mad, the boy surly, and, as soon as he thought he could safely do it, was up to some trick. You may say, "Don't have that kind of boys." If you have five boys in your employ, the chances are you have some of this self-same description.

Those boys very often, after working off their animal spirits, make your smart, pushing man, but as I am writing of girls, to girls I will return.

Now let us look at the true reason why the manufacturers gave the girl coremaker a chance. It was simply because she possessed the quality of adapting herself to the circumstances in which she was placed, and was found willing to do as she was told, and in her taking an interest in her work and doing it well. Wherever woman has been placed she has striven to do her work well, with but a small percentage of exception. She has won the confidence of her employer at his books, handling his money, as a buyer of goods, and in the daily walks of business you meet her everywhere, and she is respected by all.

To enter into these lines requires a certain amount of education, which perhaps a poor girl is unable to obtain, as all know in many families she has to help provide the living for younger brothers and sistesr. Is it any wonder the employer, with his experience with girls in other branches of business, should decide to try her in the coremaking line? The argument has been advanced, he hires her so much cheaper. If he hires boys and pays them $4 to $6 per week, and he hires girls and pays them from $3.90 to $7.50 per week, and gives them a chance, by their ability to do the work, to obtain higher wages, it seems to me the argument will scarcely hold.

Again, in these days of close competition, is not the successful manufacturer called on to take advantage of every point of advantage to his business to be successful?

In his machine shop, if he obtains castings with holes nicely cored, and those round (if so required), and not flat one way, and measuring more one way than another in diameter, is it not to his advantage, does he not find a saving in the cost of his product? If in employing boys and finding he is not obtaining the results he wishes, is he not justified in employing girls who take an interest in their work and strive to please him?

Up-to-date foundrymen have condemned the idea that any old building is good enough for a foundry, and find it for their interest and a paying investment to build well-lighted and ventilated foundries and furnish them with modern appliances for handling the work and comfort of help. They find they have a better class of employes, who take pride in their work, men who respect themselves and demand the respect of their employer, and taking pride in the standing of his production in the market. If such is the case, which is true of machine shop and blacksmith as well, if, after trying the girls in other ways and finding them to be relied on, is there any reason why he should not add a pleasant, comfortable coreroom for girls to his foundry, with separate entrance, without being accused of mercenary motives?

Look the thing squarely in the face, and give the girl her due, and her employer for giving the working girl one more way of earning an honest living.—[The Foundry.

THE VALUE OF COST-KEEPING.

Henry Roland follows his excellent articles in the *Engineering Magazine* with one upon "Effective Systems of Finding and Keeping Shop Costs." The concluding portion of this paper which appears in the November issue contains the following, which will be read with interest by managers everywhere, for the suppositious case is not an isolated one:

Let us see exactly what cost keeping can tell the cost-keeper and manufacturer. Suppose that the factory accounts are made up completely once in three months. The general manager then knows exactly what his product cost him in each 90 day period. This does not say that he knows exactly what the cost of this product will be for the three months to come. The future costs, if made with the same number of men in work and under the same general conditions, should be very close to the costs of the last three months. But the business volume of many factories is dependent, to a great degree, on the season of the year, and in this case there may be a great difference in the number of men in work in succeeding quarters; the expense apportionment per hour of labor, or per average hour cost of labor, may be, and in some manufactures regularly is, only half as great in one period of three months as in that which preceded it. Clearly, in this case, the three months is too short a time period, and the whole year's transactions must be considered in establishing the averages by which the selling cost is fixed.

If this is done, a fair price for last year's production is known; but how about this year? An accurate record of past performance is of but little value, if it does not afford a guide for improvements in future action. And here comes in the sympathetic factor. The factory can wait; its assets are not extinguished by the flight of short periods of time. Not so with the workman, whose power of earning comes, and goes away forever, with each tick of the clock. Must the workman be laid off and lose his time because the manager is unable to find customers who will pay the average total cost of his production of the past year? The intelligent manager well knows the results of broken employment; it greatly injures the workman, who is most unlikely to use his idle time to any sort of benefit to himself; it entails high labor cost of the factory product, because of the high wages which must be paid where employment is irregular, and because, in every department of every factory, there is a strong inclination to keep valued workmen on, though there is really no work for them at the moment.

Suppose that the manager says to himself: "My expense account was $2,000 for the month of last year corresponding to this, and the expense conditions are about the same now as then. I have an inquiry which I can transform into an order by fixing a price covering flat costs and 50 per cent. of the expense which they should carry. Shall I place a figure on my tender which will bring the work to me, or shall I place my price where it really belongs, with the certainty of seeing the work go somewhere else?"

This is a problem to be resolved by subtle minds. Suppose the manager settles it by the sole consideration of keeping his good men, his willing and valued servants, fully employed. That is the exercise of the factor of sympathy, at the cost of an economic crime on the part of the manager. The low price is named, the tender is accepted, and the factory goes merrily on, full handed.

Suppose now, in continuation of this incident, that other inquiries are received and replied to with low tenders, which are accepted, so that, by increased number of men in work, the expense due to the period of time is fully met. The manager has then absolved himself of his original economic sin, although he has possibly lowered the price of his product permanently. But what if he has thereby increased his sales, or the probability of sales, sufficiently to leave him better than he was? A well-known law of sales declares that price reductions increase demand permanently, and it is not impossible that this sympathetic manager finds himself nothing out of pocket by his consideration for his men.

On the other hand, suppose the manager to be perfectly informed and a rigid economist, a man of purpose and determination, whose axe hews to the line, let the chips fall where they may. In this case, he makes, in answer to the first inquiry, a tender which does not obtain the order. His workmen are laid off. The following inquiry must perforce receive a similarly uncompromising tender, with the same result of loss of the order. Perhaps, in the case of a subsequent inquiry, the necessities of his workmen, now long enough out of work to have become paupers, may induce him to make tenders which secure an order, on which he can make nothing at all above flat cost, for the reason that he has nothing else to speak of in the course of production in the factory.

Of these two managers, who differ from each other only perhaps in the melting point of their sympathies for their workmen, there are many actual examples. In the case of standard products, replies to inquiries for estimate often differ by a surprisingly small margin when coming from long-established firms of high repute. Between two such firms a very few dollars often determines the placing of an order, and the gaining of two or three successive orders may place the factory on a sound basis of profit for a considerable period of time, where either order alone would have been unsatisfactory.

Hence the extreme importance of knowing the very last dollar which, in view of all the present conditions of the factory, can be prudently deducted from the gross total of a tender. Such knowledge can be had only by detailed cost keeping. Minuteness of detail is by no means an index to the clerical labor involved in carrying out a cost-keeping system, while nothing short of minute detail can give the power of making close estimates.

BRITISH HELP IN SELLING AMERICAN STEEL.

The effort to discipline Harland & Wolff, the Belfast shipbuilders, because they refused in the great engineering trades contest of last year, to lock out their men and join the other masters, proved an unintended help to American plate mills. It was proposed to refuse to sell them shipbuilding material, the thought of the boycotters being that they could be driven out of business if British sources of supply were cut off. The export shipments of plates from Pittsburg in the past six months have included a considerable tonnage to Harland & Wolff, and these plates are laid down in the Belfast yards at a lower price than that at which they could be obtained from West of Scotland plate mills which have supplied the demand heretofore. The *Engineering Magazine* comments on the possibilities of the trade movement thus unwittingly started toward the United States:

"A Spanish proverb refers to certain homely occupations in which 'the beginning is everything.' The principle often applies to the distribution of trade. A movement which appears to have in its favor the arguments of economy and expediency is delayed until it is forced by necessity, but, once originated under this pressure, the realized satisfaction of the new experience and the acquired inertia of the new movement combine to oppose and make doubly difficult the reversion to the original status. It would be rather strange if the tactics resorted to by the British masters in a struggle to put themselves abreast of outside competition should actually result in advancing their rivals. But competition is the begetter of improvement, and the incident will spur the British iron and steel maker to fresh enterprise."

Handiness in American Machine Tools.

One of the features of machine tools of American make, which almost invariably elicits favorable comment in other countries, is handiness. It is not that the American workman is essentially a creature of comfort, which has inspired constant seeking after conveniences, but the striving for economy in methods, if not in processes, and for saving in time, is characteristic of American ways of doing things, and has ultimately left its impress on the work of the designer of machinery. Precedent counts less with him probably than with most designers of other nationalities; it is the new, the untried, but possibly useful, which appeals to him for experiment, and the outcome of his enterprise has materialized in many little labor-saving details which have helped to make an enviable reputation for the output of the American tool builder. British builders, and those on the Continent, as well, for that matter, are rather apt to disregard conveniences, and handiness in machine tools frequently receives too little consideration from them. In one instance, cited recently, an establishment was visited where some large drilling machines, made by a very well-known firm, were in use, and in which the various handles and levers were particularly well arranged. Remark concerning them brought out the statement that it was only after insisting on that arrangement, and absolutely refusing to accept the machines until they were put right, that the desirable points were gained by the purchasers. Little doubt was expressed, however, that the makers did not profit by the hint, but still continue to make the machine for others in the old style, although the improvement demanded could not fail to be evident to all users. Conservatism of this kind does not lead to a useful purpose.—[Cassier's Magazine for November.

English and American Pipe Foundries.

Much attention has lately been given, both in the West of Scotland and elsewhere, to the competition which has taken place for cast-iron pipe contracts between some Glasgow firms and Wood & Co., of Philadelphia. The fact that American cast-iron pipe makers have been able to cut prices is not new. The Wood company have already taken several contracts in Great Britain and in other European countries. They have many advantages that are not perhaps as much appreciated in this country as they should be. They get Southern pig-iron at perhaps 33s. or 34s. per ton delivered at their works; they are practically on the seaboard; and they manufacture on a large scale. Probably in Great Britain no founders can to-day buy foundry pig within 5s. per ton of the Philadelphia price. Of the mechanical equipment of the American foundries little need be said. They are not better in this respect than the best foundries at home. It is mainly a question of cheaper pig.—[London Iron and Coal Trades Review.

There is testimony on the matter of equipment that does not agree with the above. If visitors who have seen both are to be believed, American pipe foundry practice and equipment are as far in advance of English methods and machinery as are American blast furnaces and steel works ahead of like plants in Great Britain. Cheap pig iron is an important factor, but it is not all, as a visit to certain Pennsylvania, Ohio and Southern pipe foundries that could be named would demonstrate.

Recent Export Orders for American Machinery.

Referring to the recent foreign mails of New York machinery dealers, the New York *Journal of Commerce* says: "The last English mail has brought a number of favorable orders from London in the machinery line taken by agents of American manufacturers there. A concern on Liberty st., claims to have received contracts for what will constitute two carloads of small machine tools, which includes lathes, drill presses and several planers; it is stated that they are all small sizes. A pump manufacturing firm on the same street, near Broadway, has had a call for fourteen medium sized pumps, also for London, and other orders of less importance have been received in the machinery district. In fact, a large agent in Cortlandt st. said that the last two European mails had been decidedly encouraging, not only on account of the orders they have brought but on account of the favorable conditions which the writers state will exist this winter in the engineering trade in European markets. It is well to bear in mind that the bulk of the machinery bought for the London market is not for home consumption but for foreign trade. Both German and British engineering concerns are crowded with work and cannot undertake foreign contracts requiring early delivery, and as American machinery and tools are giving satisfaction from every point of view it is reasonable to suppose that orders will be diverted this way. The quotations which are being sent to agents in both Hamburg and London strengthen this opinion.

In a recent letter to the Westinghouse Electric & Mfg. Co., Mr. R. G. Vance, Jr., superintendent of the Stevens Coal Co., makes the following statements regarding the operation of the Baldwin-Westinghouse electric locomotive at the company's mines: "It has been running since May 1 and has not cost a dollar in the shape of repairs, excepting a new valve for sand box and a head-light base broken in a collision with a car. It is running on a road of 25-lb. steel, 4,000 feet long, over undulating grades, varying from one to six feet per 100 feet. Its regular load now consists of 20 cars of one and a half tons capacity and the time required for each round trip is from 17 to 19 minutes. We have pulled as high as 25 of these cars at one trip, which it did with all ease. When necessity requires we can pull 30 cars, giving 50 per cent more capacity than you guaranteed."

President Shaeffer, of the Amalgamated Association of Iron and Steel Workers, wrote some time ago to Commissioner of Immigration T. V. Powderly, New York, alleging that men were being imported to the United States to work in tin plate mills. It is reported that statements have been secured from mill workmen in this country to the effect that employes in tin plate works here have been writing to their friends in Wales offering positions in mills in the United States and instructing them how to answer questions propounded by immigration inspectors. Some suits under the contract labor law are to be brought by Commissioner Powderly.

"A Triple Entanglement," by Mrs. Burton Harrison, is the title of the complete novel in *Lippincott's Magazine* for November. The scenes are laid mainly in England and Spain. Of the sketches and stories of the number particularly interesting are "Our Soldiers' Songs," by Wm. Ward Crane; "The Craze for the Unconventional," by Jane Ellis Joy; "Who is Your Favorite Author?" by Annie Steger Winston, and "Mercer's Best Shot," by Joseph A. Altsheler.

STEAM HEATING OF SHOP BUILDINGS.

In discussing this subject with special reference to the heating of large station and shop buildings, before the Western Railway Club in September, Mr. G. W. Scott, of the Pullman, gave valuable information of general application. He advocated the low pressure return system of steam heating, using the exhaust from the engines and pumps and maintaining the circulation through the heating system by a vacuum pump. Mr. Scott stated that workshops and other buildings may be maintained at a temperature of about 70 degrees F. in zero weather, when the steam supply is equal to one boiler horse-power, or 34½ lbs. of steam per hour for each 100 superficial feet of piping or radiation; and that this amount of radiation is sufficient for heating 10,000 cubic feet of air within the room. The saving effected by using the exhaust steam from a 200 h. p. engine for heating, in place of live steam, is about $1 per hour where coal is worth $2 per ton delivered at the boilers. In addition to this saving in fuel, the water of condensation is returned to the boilers practically pure and at a temperature slightly below the boiling point, and while some fresh water will need to be added to make up for losses, still the relative volume of the returned water is such that the scale-forming elements in the water added are materially diluted. The cost of the installation and maintenance of the low-pressure system of heating is also less than that of the high-pressure system.

B. W. Thurtell, of A. Metz & Co., stated that most of the failures of the low pressure system of steam heating were due to poor engineering and improper installation. As showing what good results could be obtained, he stated that last winter he was in a building where the temperature of the returned water was 211 degrees F., and the vacuum in the air valves was about 15 inches. He said: "Such results were not obtained by guesswork. In the first place, there was taken into consideration the number of windows, and it was considered necessary to provide 1 square foot of radiating surface for every 2 square feet of window surface; to this was added 1 square foot of radiating surface for every 20 square feet of wall surface, and 1 square foot of radiating surface for every 200 cubic feet of space to be heated; the sum of these three items gave the total radiating surface to be provided, and will be found sufficient to heat the space to a temperature of from 70 to 72 degrees F. After obtaining the amount of radiating surface required, the next thing is to obtain the size of the main. For low pressure work, divide the number of square feet of radiating surface by 100 and extract the square root of the quotient, and the result will be the approximate diameter of the main required. I have never seen a failure where the piping was arranged acccording to the above rule. Of course the location should be considered, but the results are satisfactory for conditions met with about Chicago. The pipe leading from the main to a riser should be one size larger than the riser, the better to provide for the condensation returning to the tank and to prevent hammer blows."

J. W. Luttrell, master mechanic of the Illinois Central at Burnside, said that at that point they used the Sturtevant hot air system, the exhaust steam from the various engines being carried through heating pipes, around which cold air is drawn and heated and then distributed through the shops by overhead pipes. He said: "The exhaust steam, after it passes through the pipes and condenses, is carried back to the boilers by automatic pumps. This water is first deposited in a hot water heater, from there into the force pumps, from the force pumps back to the second hot water heater, and from there into the boilers. By a test we found that the water was going into the boilers at about 40 degrees F. below the boiling point. Since putting in this system and carrying back all condensation to the boilers we have found that we accomplish a saving of 0.8 ton of coal per hour. We have over-pressure valves in the exhaust pipe to take care of pressure when it gets about a certain point. We find no difficulty in taking care of exhaust steam, except in extremely warm weather. We find that the water supply for our boilers is supplied by the condensed exhaust steam, plus about eight per cent more, which is drawn from our tank supply, our only loss in water being from trying gauge cocks and blowing whistles."

A REPORT from Santiago de Cuba is that representatives of Detroit capital have purchased a large tract of iron lands at Manzanillo, and that mines will be developed.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants :—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

Bids are asked until Nov. 6 for furnishing a jib crane of 40 tons capacity for the navy yard at Port Royal, S. C.; estimated cost, $45,000. M. T. Endicott, Chief Bureau Yards and Docks, Washington, D. C.

At Aiken, S. C., J. M. Cochran will establish a foundry and machine shop.

E. M. Bailey, Charleston, S. C., wants catalogues and descriptions of locomotive jib cranes.

The Steere Machine Co., Chicago, has been incorporated with a capital of $10,000, to manufacture automatic machines and machinery. Incorporators, C. D. Steere, D. J. Bennett, Willis Melville.

The Penman Tank & Boiler Works, of East Chicago, capital $12,000, has been incorporated. The directors are W. H. Penman, Alice Penman and Thomas McCormack.

The Metal Seaming Co. has been incorporated at chicago with a capital stock of $25,000, to engage in metal working and manufacturing. Incorporators are Lewis Curtis, H. M. Mundy and Edmund Adcock.

The Allman Gas Engine & Machine Co., of New York City, has been incorporated. Capital, $15,000. Directors: George P. Lawson, of 430 Washington st., New York, and two others.

New Construction:—

Beers Bros., of Hamilton, Ga., contemplate the erection of a large machine shop opposite the Columbus & Rome Ry. station.

At Birmingham, Ala., the Hood Machine Co. will rebuild its foundry, which was damaged $15,000 by fire recently.

The Troy Malleable Iron Works Co., expects to erect an annex to its plant in Watervliet, N. Y., to cost about $15,000 Architect, M. F. Cummings & Son, Troy.

A cultivator and plow works will be erected at Germantown, Ind., by a colony of Germans to be brought from Decatur, Ill., by G. J. Byman.

The Kelly Axe Co. whose plant is located at Alexandria, Ind., is letting contracts for an extension.

It is reported that the Ohio Southern Road will erect shops at Springfield, O., to cost $40,000, on the site of those burned in 1889. There is a rumor of the acquisition of a portion of the old Whiteley plant, bought recently by the Superior Drill Co.

The Berlin Iron Bridge Co., East Berlin, Conn, is erecting for the Seamless Metal Co., Sing Sing, N. Y., across the railroad tracks connecting the different parts of its plant, a steel foot bridge. The bridge consists of lattice trusses about 68 feet long supported on steel trestle bends on either end. Underneath the bridge is a substantial trolley beam designed to carry loads from the adjoining building to the switch track of the railroad underneath the bridge.

The Benton Harbor, Mich., board of trade is concluding negotiations by which a new industry will occupy the Buss Machine Works, which have been idle for some time.

A brick addition is being built to the machine shop of the Dodge Mfg. Co., Mishawaka, Ind.

The Beaver Falls Enamel Iron Co. is preparing to enlarge its plant at Beaver Falls, Pa., and nearly double its capacity.

The Pettit Ornamental Iron Fence Co., Philadelphia, has decided to locate in Ambler, Pa. Ground and ample shipping facilities have been secured by a committee of citizens. The capital is $50,000. The company succeeds David Pettit & Co., who for 30 years have manufactured iron and steel specialites and done light bridge work, structural work, etc.

The Carnegie Steel Co., Ltd. has broken ground at Homestead, Pa., for a new universal plate mill. It is estimated that $750,000 will be expended in the improvement.

The Tacoma Brass & Model Works, Tacoma, Wash., will be enlarged and rebuilt for the manufacture of the Flynn shingle machine and a gas enigne. A new foundry will be built.

The Sigourney Tool Co., Hartford, Conn., is erecting a brick addition 80x42 feet, two stories, as an extension to their

This Letter Should Interest Many People:

SAN ANTONIO STREET RAILWAY COMPANY,
SAN ANTONIO, TEXAS.
W. H. WEISS, ... President.

MR. JOHN G. HUNTER, Dallas, Texas. August 30, 1898

Dear Sir:—We are pleased to be able to tell you that the 700 h. p. Cochrane Exhaust Heater sold us about six months ago has been in continuous use since installed, and with very satisfactory results, both in freeing our feed water from lime and magnesia, with which it is heavily impregnated, as well as the saving in fuel secured through its use. We have no difficulty in heating our water to 200° F., taking the exhaust from two pumps; when we use three or more pumps we carry the heat at 210° F. with the greatest ease. Moreover, we find that by its use our boiler capacity is materially increased. So far as our experience goes, the apparatus is mechanically perfect, and we cheerfully recomm end it to all steam users.

Yours truly, (Signed) W. H. WEISS, President.

The Cochrane Heaters are made by THE HARRISON SAFETY BOILER WORKS, Philadelphia, Pa.

machine shop facilities, which will enable them to largely increase their output of drills and to take better care of their contract work. The new building will be completed about the 15th of November.

The Eagle Farm Implement Co. is about to build a large addition to its plant at Armourdale, the suburb of Kansas City.

The Pennsylvania Co. will begin soon the erection of an addition to its wheel foundry No. 1 at Altoona, Pa., increasing its capacity 100 wheels a day.

The Union Steam Pump Co., Battle Creek, Mich., is erecting a two-story addition to its shops.

The Adolph Leitelt Iron Works, of Grand Rapids, Mich., are preparing greatly to enlarge their works, lately damaged by fire. Some $30,000 will be expended in the improvements and additional machinery.

The Champion Iron Co., Kenton, O., manufacturer of architectural iron work, prison work, yard fencing, and all kinds of cast iron work, has just completed its new addition, which gives over 35,000 sq. ft. more of floor space than the company formerly had. With this additional room fully equipped with machinery, it is prepared to handle work in the above lines to the best advantage. A number of good contracts are now on hand, including the ornamental iron work for the improvement at the State House, Columbus, Ohio.

Further additions to the plant of the Schoen Pressed Steel Co., of Pittsburg, are being contemplated. Plans have been drawn for a large blacksmith and paint shop. The building will be 250x75 feet and will be of steel. It will be erected by the Riter-Conley Mfg. Co.

The city council of Beaver Falls, Pa., has passed an ordinance vacating Third st., 18 feet in width and 400 feet in length, for the use of the Union Drawn Steel Co., to enable it to put up a two-story building 375 feet long. The addition will increase the number of employes 200.

The recently completed addition to the Wisconsin Malleable Iron Co.'s foundry, at Milwaukee, gives employment to 65 more men, the total number now being 700.

It is reported that the Illinois Central shops at Clinton, Ill., will be enlarged.

The National Iron Works, at Spokane, Wash., recently burned, will be rebuilt on a larger scale.

An addition is being built to the foundry plant of Kasa & Wahler at Wallingford, Ia.

The Champion Rivet Co., Cleveland, which has occupied leased buildings, is about to carry out its plans for the construction of its own plant at the C. & P. Railroad and Union st.

Additions, Enlargements, Removals, Etc.:—

The Covert Mfg. Co., of West Troy, N. Y., manufacturer of harness hardware specialties, including snaps, rope goods, chains, etc., is about to enlarge its plant. The company has had a most successful career, in which the winning of the patent infringement suits it has been compelled to bring from time to time has been a noteworthy feature. The Troy *Daily Press* refers thus to the new plant: "The Covert Mfg. Co. has for months been running to its full capacity, and having found it extremely difficult to fill orders has been compelled to again break ground for a substantial extension of its works. A large and commodious brick building for manufacturing purposes is now in course of erection, and immediately on its completion will be equipped with special and improved machinery, which has already been ordered. It is the intention of this company to enlarge its line of goods and many new articles of manufacture will be added. Notwithstanding the magnitude of the improvements now being rapidly pushed forward, the additional plant will be running by January 1 of the new year. The enlargement of the boiler house is already completed and a much larger boiler has taken the place of the old one. This was rendered necessary on account of the increasing business of the company. The Covert Mfg. Co. has never since its organization, 25 years

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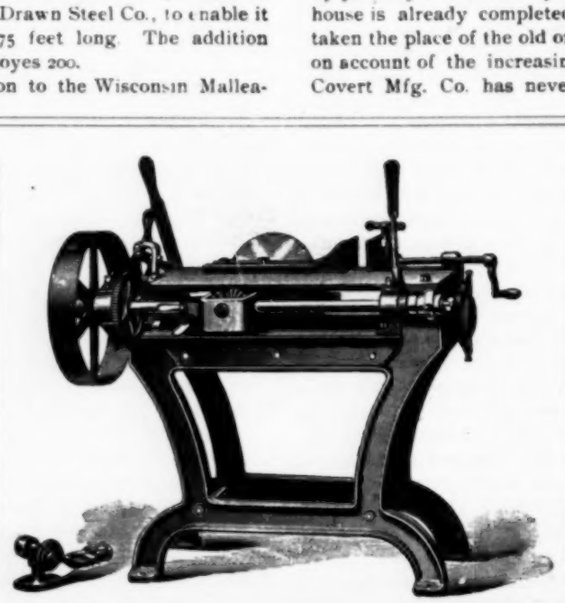

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Producer Gas under Tubular Boilers, saving 20 per cent in fuel. NO SMOKE.

The A B C of Iron, Now $1.

ago, closed its doors or shut down its machinery for want of orders or a depression of business."

Fires and Accidents:—

The Wright shovel-plate plant at Greenfield, Ind., was burned Oct. 27, the fire starting from a gas explosion. The loss is covered by $7,500 insurance.

At Oswego, N. Y., the Tonkin Boiler & Engine Works were destroyed by fire Oct. 28. Loss, $105,000.

The Higgins Spring & Axle Co.'s plant, at Racine Junction, Wis., and the adjoining building of the R. B. Lang Specialty Co., containing dies, patterns and nickel plating machinery, were damaged $3,000 by fire on Oct. 22.

A fly-wheel burst at the plant of the Pennsylvania Bolt & Nut Works, Lebanon, Pa., Oct. 25, wrecking a portion of the works and injuring four men.

General Industrial Notes:—

Hecla furnace charcoal, in Lawrence Co., O., is being stocked up and getting ready for a short blast beginning about Dec. 1.

The report of the appraisers filed in the voluntary assignment of the Kepp Gear Wheel & Foundry Co., of Allegheny, Pa., shows assets filed at $24,313.63.

An arrangement has been made with the Thomas Furnace Co., Niles, O., by which hot metal will be taken from their Thomas Furnace direct to the Bessemer steel plant of the Ohio Steel Co. at Youngstown. An abandoned railroad track owned by the Pittsburg & Western Railroad will be used and the haul will be about six miles.

No. 1 blast furnace of the Pennsylvania Steel Co., at Steelton, Pa., has been blown in. Four furnaces at Steelton are now active.

The Midland Steel Co., Muncie, Ind., who began operations in the fall of 1892, to mnufacture open-hearth steel billets, tin plate bars and fine sheet steel especially adapted for stamping work, have now a plant double their original capacity. They kept working to the fullest extent through the panic of 1893, and have been in full operation ever since.

Clare, Duduit & Co., one of the oldest furnace firms in the Hanging Rock region, went into the hands of a receiver last week. The application was made by James D. Clare, of Portsmouth, the senior partner. The firm of Clare, Duduit & Co. operated Madison furnace and owned 2,200 acres of land in Jackson and Gallia counties. The receivership is not appointed because of inability to meet indebtedness, but to wind up the business.

Madison Furnace has manufactured charcoal iron since 1868, but of late there has been no profit in that class of iron and the furnace has been idle over a year. A. J. Duteil, general superintendent, was appointed receiver.

The Schoen Pressed Steel Co. is now turning out heavy steel cars at the rate of 17 a day. A number of important orders have been received recently, and negotiations for others are in progress.

The Steel Ball Co., of No. 39 West Randolph st., Chicago, has made rapid progress in the introduction of its balls to the bicycle trade since the establishment of its factory early in the present year. The balls are made by special machinery invented by C. C. Hill, the general manager, in which they pass through four processes—namely, forged, rough ground, fine ground, and polished. The factory is to be considerably enlarged in the near future, and early next year a factory will be built in England to supply the European trade. A considerable part of the company's product is now being exported, and the growth of the foreign demand has been so heavy that it seems necessary to meet it by establishing a factory across the Atlantic.

The new rolling mill at Sheffield, Ala., completed last summer, is being operated by the Sheffield Rolling Mill Co. Machinery from the abandoned Midway Iron Works and Roanoke Rolling Mill, at Roanoke, Va., was used. The plant contains 12 double puddling furnaces, 5 heating furnaces, and 4 trains of rolls. It produces bar, angle, rod and band iron, small size T rails, D links and cotton-ties, and railroad and boat spikes.

New equipment orders: Norfolk & Western 6 locomotives; St. Paul, 5 passenger locomotives; Inter Colonial, 15 locomotives; Wisconsin Central, 1,000 box cars; Oregon Short Line, 250 hopper cars.

The Pittsburg Ornamental Iron Works has made an assign-

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ment. The plant in Allegheny has been occupied for years on ornamental stone and other work.

The Wright Spade & Shovel Co., of Anderson, Ind., has purchased the Akron Steam Forge at Ellwood, Ind. It will be changed into a rolling mill and the company will manufacture heavy sheets for its Anderson factory.

The owners of the Ohio Falls Iron Works at New Albany, Ind., the McCulloch estate, the New Albany National Bank and others have given to Peter Arlund and associates an option of 60 days on the plant, the pricebeing between $50,000 and $60,000. The holders of the option claim that they have parties of New York and St. Louis that stand ready to organize a corporation with ample capital to operate the works, and they expect before the option expires to have all their plans perfected to put the plant in operation in every department.

The auction sale of the machinery at the Ames Mfg. Co.'s plant at Chicopee, Mass., beginning Oct. 1, brought together over 150 bidders. The principal buyers were the Lamb Mfg. Co., of Chicopee Falls; the Thomas Laughlin Co., of Portland; the Connecticut Valley Mfg. Co.; Morgan & Wilcox, of Middletown, N. Y.; Prentice Tool & Supply Co., of New York; Manning, Maxwell & Moore, of New York; Niles Tool Works, Hamilton, O.

The Newton Machine Tool Works, of Philadelphia, have an order from John Brown, of Sheffield, Eng., armor plate manufacturer, for a special double radial drilling machine for drilling armor plate. The works is also completing the drawings of a large cold saw cutting-off machine for the armor plate works at Creusot, France.

We learn that the Stirling Boiler Co., Barberton, O., although the capacity of its works has been doubled within a year, has orders enough on hand to keep it busy for four months and is working the large tools in its shops at night.

The Morgan Engineering Co., Alliance, O., is said to have just received an order from Austria for an open-hearth steel mill, and a large order from Russia for cranes, etc.

The Oliver & Snyder Steel Co. is erecting a third Allis blowing engine and adding a fifth stove at Rosena Furnace, New Castle, Pa. It is expected that with these additions the regular output of the furnace will be increased to 400 tons a day. The new engine is to be operated by the exhaust steam from the present engines. The steam cylinder will be 96 x 60 and air cylinder 100 x 60. The steam cylinder is fitted with regular Reynolds-Corliss valve gear and the air cylinder with Kennedy patent inlet valve and Reynolds patent outlet valve. This engine will be exactly the same as the low pressure side of two compound machines the E. P. Allis company is now building for the Carnegie Steel Co., Ltd., for its Duquesne furnaces. The Carnegie engines have steam cylinders 50 and 96 x 60, air cylinders 100 and 100 x 60. These will be the most massive blowing engines ever built.

J. W. Hoffman & Co., of Philadelphia, were awarded the contract for the erection and equipment of the naval coaling station for New London, Conn. They were the third lowest bidders, at $137,500. The plans adopted were drawn up by the Brown Hoisting & Conveying Machine Co., of Cleveland. With the exception of the foundations, etc., this concern will build and equip the entire plant for J. W. Hoffman & Co. The contest for this contract was an exceedingly interesting one.

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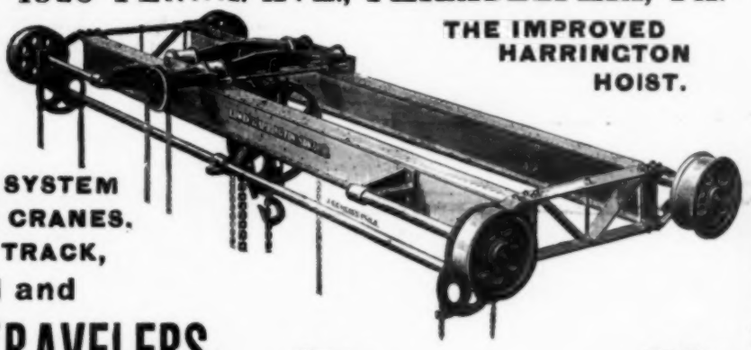

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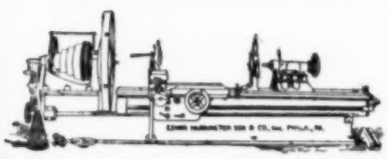

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Dispatches from Monmouth, Ill, state that the Iowa Central will build a 10-stall roundhouse, repair shops and other buildings at Monmouth.

A billet-piercing mill costing about $50,000 is being put in at the tube works at Shelby, O. With this machine the company will buy solid billets instead of hollow ones and pierce them in this country. By doing this the tariff on hollow billets is avoided, as the steel all comes from Sweden. The piercing mill will employ about 20 additional men.

M. V. Wagner, of Chicago, has been at Muncie, Ind., a dispatch says, negotiating for the mill of the White River Iron & Steel Co., which has been idle for two years. It is reported, also, that Wm. Martin, of Pittsburg, formerly secertary of the Amalgamated Association of Iron and Steel Workers, is figuring on the lease of the Darnell mill, at Muncie, intending to operate under his new process for horse-shoe iron.

The report of the receiver of the Heilman Machine Co., Evansville, Ind., for five months ending Sept. 21, shows $22,000 net earnings, or 11 per cent on the capital. The receiver has been ordered to pay 15 per cent of the company's indebtedness and to continue the business.

The Cyclone Woven Wire Fence Co. will move to Waukegan, Ill., from North Chicago and will build this year.

The Morton Tin Plate Co., Cambridge, O., is installing a large Corliss engine, the flywheel of which will be 25 feet in diameter.

Excelsior Foundry, Bay City, Mich., has the contract for 150 cast iron pans for the North American Chemical Co. These pans weigh several tons each. The work will give employment to a large force for some time.

The night turn at the Duquesne Steel Works, of the Carnegie Steel Co., Ltd., broke its own record Oct. 20, when the production was 1,819 tons.

Another large shipment of machinery for mines in South Africa, and portions of the large engines for the London underground railway, have just been shipped by the E. P. Allis Co., Milwaukee, whose export business is larger than ever.

Following the recent recommendation of its board of directors, the stockholders of the Cambria Iron Co. voted on Oct. 26 to lease its property to the Cambria Steel Co. upon a guaranteed rental of four per cent per annum upon the capital stock. The new company, as has been previously announced, has a capitalization of $18,000,000.

J. B. Doan & Co., of Chicago, have just been awarded the contract for about $20,000 worth of improved machinery by the Rock Island Arsenal. The order includes lathes of various sizes, upright drills, milling machines, screw machines, shapers, power hammers, etc. This firm reports quite a satisfactory trade in the West.

The Ensign Mfg. Co., of Huntington, W. Va., has received an order from the Ohio Southern Railroad for 200 30-ton box cars. This company has received orders for 1,000 cars in the past few weeks.

The Beaver Falls, Pa., plant of the American Steel & Wire Co., is being put in readiness to start again.

At New York the firm of John Stephenson & Co., well-known car builders, was placed in the hands of receivers on application of representatives of a majority of the directors of the company. The liabilities, including all the mortgage indebtedness on real estate, is approximately $700,000. Assets will probably equal liabilities. The cause of the failure, it is said, is the enormous outlay of money on the new plant just completed at Rahway, N. J.

The lathes included in the equipment of the new Franco-American Motor Carriage & Bicycle Co. have been contracted for with Hill, Clarke & Co., who will furnish over 90 in all. The larger ones will be Mark Flather and the smaller ones Fitchburg. It is also reported that the screw machines, 25 or 30 in number, will be of Bardons & Oliver make, and will be sold through Hill, Clarke & Co.

It is said that all the 150,000 freight cars of the Pennsylvania Railroad Co. are now in use and that 40,000 more could be utilized. If the cars in use were placed on a single track the string would be 6,375,000 feet, or 1,207 miles long. If all the cars were loaded it would mean 5,625,000 tons in freight alone.

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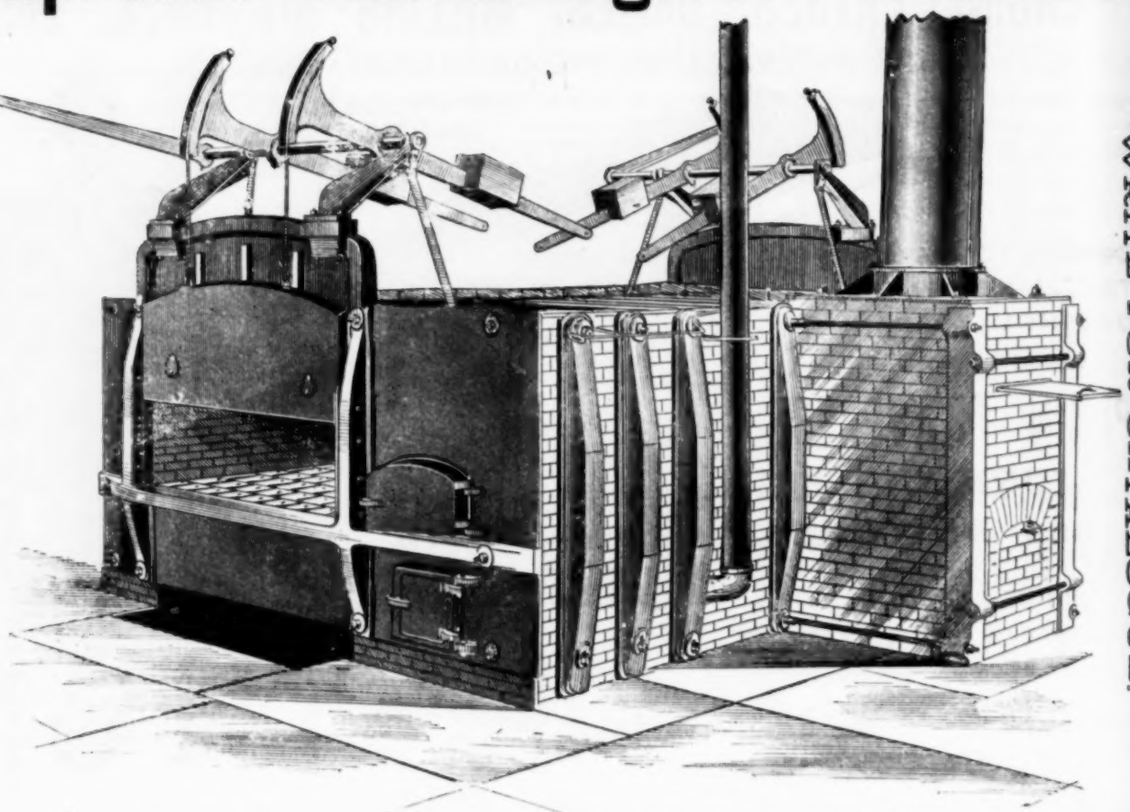

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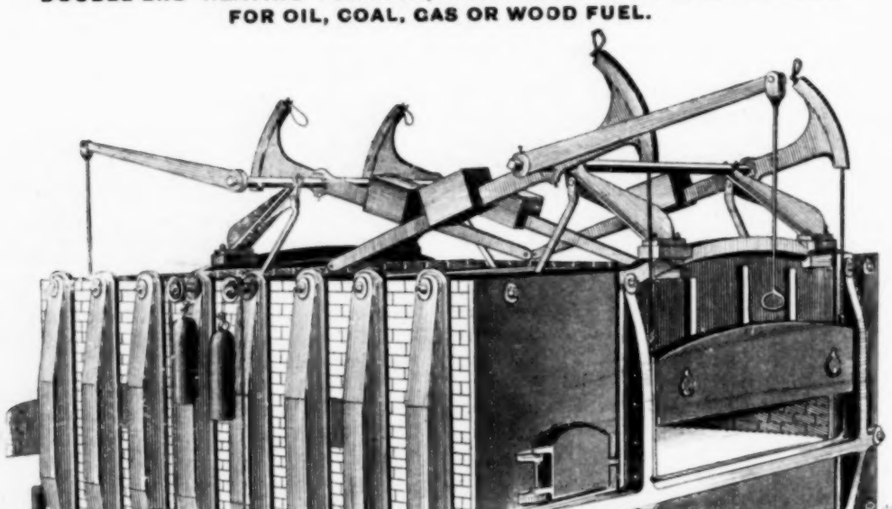

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